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PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN

BENGAL

FOR

1867-68.

By H. LEEDS, Esq.,

CONSERVATOR OF FORESTS, BENGAL.

WITH A REVIEW OF THE REPORT BY THE LIEUTENANT-GOVERNOR AND THE ORDERS OF THE GOVERNMENT OF INDIA THEREON.

BENGAL SECRETARIAT LIBRARY.

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PROGRESS REPORT
OF
FOREST ADMINISTRATION
IN
BENGAL,
1867-68.

BY H. LEEDS, ESQ.,
CONSERVATOR OF FORESTS, BENGAL.

No. 33A, dated 13th October, 1868.

From—H. LEEDS, Esq., *Conservator of Forests, Lower Provinces,*

To—*Secretary to the Government of Bengal.*

I have the honour to forward Forest Administration Report for the year 1867-68.

I regret that I have been unable in this Report to give more general information regarding all the forests in the Lower Provinces, and hope to be able to do so in the next, when I shall have had time to become better acquainted with the various forest tracts than I could be after so lately taking charge of them.

The annual Budget revision for 1868-69, and Estimates for 1869-70, are this day forwarded to the Accountant General.

INTRODUCTORY.

The Progress Report of Forest Administration in Bengal for the year 1867-68 is divided into the following Sections :—

1.—Examination of the forests.
2.—Plantations.
3.—Yield of the forests.
4.—Financial results.
5.—General.

Forwarded to Accountant General for revision on 14th September 1868.

2. The Statements which accompany it are those prescribed by the Government of India in Circular No. 8, dated 10th August 1866—

1.—Summary of Revenue and Expenditure.
2.—Abstract Cash Account.
3.—Statement of Outstandings.
4.—Statement of Timber brought to depôts.
5.—Annual Timber Account.
6.—Statement of amounts realized by sales.
7.— „ of Expenditure on account of timber.
8.—Annual account of Forest revenue.

Section 1.

Examination of the Forests in British Sikkim and Bhootan.

3. The Forests may be divided into two classes—the Temperate forests situated on the Hills, and the Tropical forests in the Plains.

Temperate Forests, Sikkim.

4. In British Sikkim the tracts which are under the control of the Forest Department are "Reserved Forests," under rules sanctioned by Government and published in Notification dated 15th August 1866.

5. The following Schedule gives a list of these tracts, showing area and estimated stock of available timber :—

NAME OR SITUATION OF FOREST.	ESTIMATED AREA IN SQUARE MILES.	ESTIMATED STOCK OF VALUABLE TIMBER, OR NUMBER OF AVAILABLE TREES.	REMARKS.
No. 1.—Ridge between Jore Bungalow and Kurseong, West Slope.	5½	600 Magnolia. 8,000 Oak and Chestnut. 5,000 Inferior kinds, such as Chalawnee, Cherry and Lallee.	
No. 2.—Same Ridge and Spur to Rungbee, East Slope.	6	800 Magnolia. 4,000 Oak and Chestnut. 8,000 Inferior kinds.	
Southern end of between Balasun lee.	4	If estimated to contain same average as above tracts. 600 Magnolia. 5,600 Oak and Chestnut. 4,200 Inferior kinds.	Of this area, 3 square miles are included in reserved lands for Cinchona culti-

6. Besides these there is a fine tract of forest, about 12 square miles in extent, ca the "Goom Pahar" near Darjeeling, whence most of the local supplies have been drawn i some time past. This tract is worked and managed by the Darjeeling Municipality. It h been proposed to transfer this forest to the Forest Department, but the terms cannot b agreed upon at present with the Municipality.

Temperate forests, Bhootan.

7. On the Bhootan side of Teesta, the Temperate forests above Dalimkote have not yet been explored. They cover an area larger than that now left on the Sikkim side, and as they have not been worked, probably contain large stocks of timber. But at present they are almost inaccessible from want of roads, or even paths, and so situated that their produce can scarcely under any but extreme circumstances pay the cost of working.

8. All these Temperate forests stand on steep mountains and ridges, the gradients of which is generally from 30° to 35°, and at heights varying from 6,000 feet, their present lowest limit up to some 8,000 feet above the sea. In British Sikkim almost all forest below 6,000 feet has been cleared by the indigenous inhabitants for bhoota and other local cultivation, and by Tea-planters for their gardens. The Natives do not appear to cultivate above 6,000 feet, and thus a well-defined line of forest exists at this elevation, which line was therefore adopted as a boundary of the reserved forests. Demarcation of these tracts in a regular manner will gradually be carried on where necessary as the tracts are worked; for otherwise this would be a very expensive and tedious operation in these localities, and it is not imperatively needed at present.

9. Between 6,000 and 3,000 feet scarcely any forest exists. All this enormous extent of country in these hills has been cleared by natives and Tea-planters, in many cases far beyond the powers of the owners to cultivate the soil, and therefore recklessly, also to their own cost and disadvantage, as toon and other woods which formerly grew at these altitudes, and are required for making tea-boxes and other purposes, are very scarce, and will before long be unknown altogether, unless re-planted.

10. The most valuable woods found in the Temperate forests are—

Chestnut, Magnolia, Oak, *viz.*, *quercus lamellosa*, and two other species.

11. These trees are generally of great age, and grow to a large size, up to 12 and 14 feet girth. They form one-fifth of the whole of the trees in the forests.

12. The tracts in which they grow are very damp, the trees are all covered with mosses, orchids and creepers of various kinds. The proportion of 2nd and 3rd class trees is limited as shown in the Table below, and natural re-production of seedlings forms but a very small percentage, not more than 10 per cent. of the valuable trees—

Statement showing the average numbers and classes of trees per acre in the Temperate forests of British Sikkim.

Locality.	Description of timber.	1st Class.	2nd Class.	3rd Class.	4th Class.	Total.	Remarks.
Rungbee.	Oak ...	5	...	...	...*	5	* Class 4.—Seedlings do not average 4 per cent. on this area.
	Chestnut ...	3	...	...	...	3	
	Magnolia ...	11	...	...	...	11	
	Lallee ...	...	...	1	...	1	
	Kupassi ..	...	...	2	...	2	
	Kowlah ..	...	32	...	...	32	
	Miscellaneous ...	1	21	22	...	44	
	Total ...	20	53	25	...	98	
Mahalderam.	Oak ...	...	3	...	...†	3	† Class 4.—Seedlings do not average 4 per cent. on this area.
	Chestnut ...	...	3	.	...	3	
	Magnolia ...	...	...	17	...	17	*Note.*—This locality must have been worked.
	Lallee ...	...	...	14	...	14	
	Kupassi ...	...	3	...	...	3	
	Kowlah ...	...	19	...	...	19	
	Chalawnee ...	...	11	...	...	11	
	Miscellaneous ...	...	25	41	...	66	
	Total ...	...	64	72	...	136	

The situation of these tracts, at a distance varying from 20 to 60 miles from the forbids their at present being worked for supplies to distant markets; but for this, they be made to furnish considerable supplies of valuable timber to local markets in the as they are not difficult or expensive to re-plant (*vide* Section on Plantations), and might bear a considerable portion of the demands which up to the present time have been met the Sâl forests in the Plains, and by which these latter have been exhausted. The pros- of a Railway to the Hills is already giving the timber of these Temperate forests a value which has not been hitherto conceded to it, and a strict conservancy of all these forest tracts is demanded.

14. The tracts of forest included under No. 1 in Schedule have been chiefly worked during the past two seasons to supply the Public Works Department with timber for the new barracks at Darjeeling and for the cart-road. These tracts, as also the Goom Pahar forest, are available for all local wants, and are not expensive to work for these purposes.

15. The tracts under No. 2 in Schedule, or the east slope lying at the head-waters of the Mahanuddy, have not yet been worked, and cannot be until a road and paths have been opened out.

Tropical forests, British Sikkim.

16. The Tropical forests consist chiefly of Sâl forests, which have been worked to such an extent that timber of 5 feet and above in girth is now only to be found in places whence the expenses attending the extraction of the timber can scarcely be covered by the sale even locally. Though devoid of large timber, they are very rich in young trees, and will become very valuable indeed some 30 or 40 years hence, when probably the means of transport will be more favourable than they are at present. The stumps met with in the forests, some measuring 15 feet in girth, show that large timber formerly stood in these forests, and will again if left to grow.

The other valuable woods of the Tropical forests are—

Urjun (*Terminalia speciosa.*)

Sitsal (*Dalbergia latifolia.*)

Sissoo (*Dalbergia sissoo.*)

Chalawnee (*tropical Gordonia Wallichii.*)

17. *List of Tropical Forests in British Sikkim.*

Name and situation of forest.	Estimated area in square miles.	Estimated stock of valuable trees.	Remarks.
Sâl.			
Dulka and Bagdagraghars	10	No Sâl or Sissoo for felling, 800 Chalawnee.	
Champasari Jhar ...	6	No trees fit for felling.	
Near Sukna Hât ...	3	Ditto	In patches.
Outer Hills, including Lohogworee forest, east of Meech river.	12	Sleeper timber available, 1,000 Chalawnee.	Logs cannot be brought out owing to locality.
Teesta and Great Runjeet Valleys.	23	12,000 ... ... 5,000 Chalawnee, and other trees.	An average good season's work is 500 tons.
Sissoo.			
Forests in the Meech river	3	No trees for felling.	
Forest between old and new Balasun.	1	Some few trees of 5 feet in girth.	
Below Sivok on Teesta ...	0¾	No large trees.	

18. Natural re-production in these tropical forests, that is, of sâ urjun and khair, is plentiful, and in the case of sâl so abundant as to rec

19. The sâl forests on the outer Hills and immediately above the Terai, u elevation of 3,000 feet, their boundary are fine; but only a very limited quantity timber still remaining in them fit for the axe can be brought out in the shape of logs. may be estimated to contain timber to furnish some 40,000 to 50,000 sleepers.

20. The richest sâl forests in British Skikim are in the Teesta and Great Ru Valleys; but the difficulties attending the extraction of timber from these forests very great.

Difficulties in bringing out timber.

21. The only channel by which timber can reach the Plains is by the Teesta River. This stream, from the junction of the Great Runjeet, the British boundary, to its entrance into the Plains, is a swift rushing torrent during the rains, down which it is feared that it will be found impossible to pass timber, as it will be unmanageable and inevitably be lost. During the dry weather the difficulties are of another kind, but almost equally great, as, when the water subsides, the boulders in the rocky bed make their appearance, and break up the stream into a succession of formidable rapids. No boat can be launched for the work of collecting or pushing off and guiding timber which is in transit past the rocks, and the snow-water coming down strikes any one who happens to go into it with such immediate cramps, that few, between this and the force of the water, ever get out of the river again alive.

22. But these difficulties would be comparatively easy to overcome if the timber to be sent down would float. The specific gravity, however, of Sâl, a cubic foot of which weighs 80 lbs 5½ oz. green, and 58 lbs 9½ oz. seasoned, forbids its floating, and thus every log has to be buoyed up by bamboos lashed fast to it. These small rafts, once launched into the stream, are entirely at its mercy until they reach the rope stations, placed at intervals in a reach of still-water above the last rapid at the entrance of the river into the Plains. Those acquainted with the transit of timber will be able to form some idea of the loss which must occur from the striking of these rafts against boulders on the way, and plunging into deep pools from which many never rise again.

23. These difficulties and dangers represent cost, and, together with the removal from the foot of the Hills to depôt, render the expenses on extraction of timber very heavy. Formerly sâl timber was extracted from the Terai forests at small expense, and sold to the Railways and in Calcutta at considerable profit to the contractors. But these contractors have done their work by extracting every available stick which offered a chance of being remunerative, and only stopped when, having exhausted the forests in the Plains, they found those in the Hills presented little chances of gain.

24. An experiment as to cost of transit has been made this season by sending 250 logs of timber *viâ* the Mahanuddy to Calcutta for sale. If the expenses are low enough to encourage a further experiment, a small batch of logs will be sent down the Teesta *viâ* the Berhampootra next season to test that route; but as long as Sâl timber is supplied from Nepal, on which there is no transit duty, and the burdens it has to bear are lighter than the cost of working British timber, it is to be feared that Sikkim timber cannot be advantageously sold in Calcutta, and the supplies are not at present sufficient to warrant any large transport of timber out of the District.

Tropical forests, Bhootan.

25. The Tropical forests on the Bhootan side in the Western Dooars, a list of which is given below, are better stocked with mature timber than those in British Sikkim; but here also the extraction of timber has been far beyond the natural yielding powers of the forests, and many of them should be closed for years, while in others the available stock should be carefully worked. The Sâl timber in the forests must not any longer be made to supply all local and neighbouring demands, as has been the case up to the present time; but local demands must be limited, so far as *description* of woods used is concerned, by the supplies they ought, in their present state, to produce under proper management.

26. It is natural before Forest conservancy has been established, and the forests been examined as to their supplies and re-production, or any restriction has been placed on the felling of timber, that the best and most durable kinds of timber alone should be felled and used for all purposes; but this is a most wasteful use to make of valuable property, and the time must come, and has now come, when Sâl timber must be protected from the axe, and other good woods, though not so valuable, be used for many purposes for which they will be [illegible] if not quite, as useful.

Forest Rules having yet been sanctioned for Bhootan, the forests in the Western they were made over to the Forest Department in December 1866, are not [illegible]ncy; the Civil Authorities have the control of the felling of all the timber [illegible]his authority exists, it is impossible to regulate the supplies to be brought [illegible]hese forests.

28. *List of Sâl and Sissoo Forests in the Western Dooars.*

Name and situation of Forest.	Estimated area in square miles.	Estimated stock of available trees.	Remarks.
Sal.			
Chary Maree ...	2	No Sâl above 5 feet in girth.	
Ragedhanga ...	2	Ditto.	
Rangamatee ...	3	Ditto.	
Latagoree ...	6	Ditto.	
A.			
Ramshai ...	2	Ditto.	
B.			
Ramshai ...	1	Ditto.	
Mooraghât ...	1½	No Sâl above 6 feet in girth.	
Salbaree ...	1	None above 5 feet in girth.	
Nathabaree ...	8	2,000 trees above 6 feet in girth.	
Aluchungry ...	1½	No trees above 3 feet in girth.	
Duma ...	3	5,000 trees above 6 feet in girth.	
Buxa ...	4	1,000 . ditto.	
Haldabaree ...	6	1,000 ditto.	
Outer Hills ...	60	5,000 trees above 6 feet in girth, and timber for 5,000 sleepers.	Chalawnee, Urjun, and Khair plentiful.
Sissoo.			
Tandoo ...	3	No trees above 4 feet in girth.	Very scattered.
Torsa ...	6	2,300 trees above 5 feet in girth.	

Section 2.

Plantations.

Sikkim Plantations.

29. The clearing of land for plantations had not been provided for before the beginning of the dry season, and consequently only a limited area can be cleared and planted out during the present season. Arrangements will be now made to prevent any future delay of this kind. Orders have been issued for preparing 50 to 70 acres above the old Darjeeling Road just beyond Jore Bungalow. This area will be planted during the rains with Oak and Magnolia. Seeds of these kinds of timber have been sown in nurseries, ready for transplanting.

30. As the germination * of the Magnolia seeds was rather doubtful, young seedlings from Nepal were sent for, and a sufficient stock of plants has been collected to stock many hundred acres of land.

* *Note.*—They have since germinated freely after being eight months in the ground, showing that they do not perish so quickly as has hitherto been supposed.

Proposed operations.

31. It is proposed to go on planting this tract as the felling and removal of all available timber goes on gradually in the tract. The cost of these plantations will not probably exceed Rs. 12 to 15 per acre.

32. Chestnut and Walnut plantations will be carried on in like manner above Kurseong, as the felling operations progress in that locality.

Larch seeds.

33. The Larch seed received from England was planted at elevations varying from 7,000 feet at Rungbool, 6,000 feet at Rungyroon, and 2,500 feet at Loom, but without success at any of these places. None of the seed germinated, with the exception of 2 or 3 sown in the Loom Tea plantation, at a height of some 4,500 feet, and these died off immediately. The Assistant Conservator reports that the seed, on inspection before planting, appeared to be in perfect condition. It would be interesting as an experiment to try it again; but where there are more valuable local timbers easily grown, there would be no great advantage in introducing British Larch if difficult to grow.

34. Several species of Eucalyptus have been sown on the south-west slopes of the Mahalderam, and the seeds have germinated freely; but this kind of timber is not required for domestic purposes here, as the stock of firewood is not likely ever to be insufficient. The plants, however, will be carefully protected for the interest that attaches to the introduction of strangers.

Eucalyptus.

35. The small Teak plantation in the Terai has not proved successful, partly perhaps from the inferiority of the seed sown and obtained from the Botanical Gardens, and in some measure on account of the unfavorable locality in which it was sown, which is too flat and wet; a few plants only are still alive. Experiments are being made with teak seed obtained from Burmah (which is probably better and much cheaper than that obtained from the Botanical Gardens) in the Chittagong District where a small plantation has been sown; and also in the Sikkim Terai on a well drained locality. The mahogany trees planted in the former teak plantation, though at first they seem to have promised well, are now showing signs of disease.

Teak Plantation.

36. Owing to the risks and dangers which attend all transport of timber from these localities, and also the expense, it does not seem advisable to carry on very extended planting operations of woods which do not float. Such localities will be chosen for planting as are more favorably situated for the transport of timber to market; for instance, the Daminkoh Estate in the Sonthal Pergunnahs, and others which will be sought in different Districts.

Extensive planting operations in these localities not at present advisable.

37. A register has been opened, showing the girth of 150 Sâl trees at three different parts of the trunk, and in three different localities, *viz.*, in the Champasarai Jhar, on a cleared and thinned tract; in the same forest in an uncleared and unthinned tract; and at Sookna, on the outer Hills.

Register of growth of trees.

38. These trees will be measured before and after the rains every six months, and the results entered in the Register, not only to make observations as to rate of growth generally, but also as to rate on the Hills, and also after thinning. The results of first measurements do not accompany this Report, as there are no observations to record; but these, with the subsequent measurements, will be forwarded with future Reports. On other points connected with age of trees and reproduction, information will be given in future Reports after a closer examination has been made of the forests than could be carried on during the past season.

Valuation Statement of Timber in hand on 31st March 1868.

Description of Timber at different Depots.	No. of Logs, Sleepers, or pieces.	Rate.	Estimated value.
		Rs. A. P.	Rs. A. P.
Sâl and Sissoo logs ...	4,724	16 0 0	75,584 0 0
Sâl and Oak Sleepers ...	31,104	1 8 0	46,656 0 0
Sâl Planks	1,113	1 8 0	1,669 8 0
Shingles	3,01,860	4 per thousand ...	1,207 7 0
Oak and Magnolia Scantlings, running feet.	865	8 per hundred running feet.	69 3 2
Total ...	...	.....	1,25,186 2 2

Section 3.

Yield of the Forests.

39. Schedule No. 4 gives information concerning the timber extracted from the Forests in British Sikkim during the past year, *viz.*:—

Timber extracted during the year from the Sikkim Forests.

Logs	...	...	... No.	5,580
Sleepers	...	...	... „	30,638
Planks	...	...	... „	1,503
Shingles	...	...	... „	470,110
Scantlings	...	...	Running Feet	36,184

40. All timber up to the present time has been worked out by direct Government agency; but it is hoped that Permit-holders will, in time, be induced to enter and work the forests, by which the Departmental Establishment will be relieved from a mass of work and accounts, occupying time which should be employed in conservancy matters.

By whom worked.

41. The work is carried on entirely by Nepalese coolies, who collect during November and December at the foot of the Hills sometimes to the number of 1,700 to 2,000 at a time, returning for the most part to their own country again in May, when the operations close for the season, and the climate becomes very unhealthy. Some few, instead of returning home, go up into the Hills, and are employed on plantations and felling and stacking timber in the Temperate forests. It is hoped that many of these people will gradually be drawn along the base of the Hills, and be induced to settle on the lower slopes, by which labour will become more easily available than it has hitherto been. Already, encouraged by the Commissioner of Cooch Behar, a party have settled in the neighbourhood of Buxa, and this beginning will probably lead to the forming of other settlements. These coolies suffer a great deal from fever, of which they are greatly in fear. But they readily accept European treatment, and it is proposed next season to have an Apothecary stationed among them near the Teesta to treat them at once when they get sick, or meet with accidents.

42. As regards the yield from the forests of the Western Dooars during the past year, little can be said.

Yield from the Western Dooars.

43. The whole of the forests were sold to a Native in January 1867 on his paying a sum of Rs. 9,200; but there are no reliable records to show what timber was extracted by this Permit-holder. The Officer who was in charge, and has since been dismissed, seems to have neglected the instructions issued to him, and done nothing to control or supervise the operations which were being carried on.

44. Besides the work above mentioned, some 1,320 sleepers were cut by contractors employed by the Officer lately in charge, but only 380 of them came out of the forests during the year, and these did not arrive at any Depôt.

45. During the past season, contractors entered the Buxa Forests and felled about 2,000 logs above 6 feet in girth. These are the best stocked forests in the Dooars. The timber is very fine, but it cannot be brought out during these rains owing to work having begun late, and the contractors not having proved up to the work they undertook.

46. These logs will meet local requirements in that neighbourhood and in Cooch Behar for some time to come. Timber is also being collected on the Toorsa River, near the Alipoor Road, to meet the requirements of the proposed new station at Falacôtta. It is hoped that so soon as the Forest Rules now before Government are made law, and the Forest Department take entire charge of all forest matters in these Dooars, the complaints now made regarding supplies will cease. The Forest Department is not responsible for present supplies. The Civil Authorities in these Dooars have still the control of the felling of timber and of granting mahals for petty supplies.

47. Of timber extracted from the Tropical forests, a large proportion is in hand. Ten thousand sleepers were sold to a contractor early in the year, and are now being taken over by him. The Public Works Department have received large supplies of timber brought out of the Temperate forests, and some also from the Tropical forests; the timber in hand will probably realize good prices as soon as the real value of timber, which is now occupying attention, shall have been fixed and placed on a sound basis.

Timber at Depôts.

48. A Valuation Statement is annexed of timber in hand, based upon the actual expenses incurred on the timber, and not on its probable value when sold, which would be much higher, but might give fictitious amounts in calculating and comparing yearly results.

Valuation of timber in hand.

Proposed operations for next year.

49. The operations proposed for the next year in the Sikkim District, are as follows:—

50. One thousand logs (about 600 trees) are to be cut and stacked near the old Darjeeling Road beyond the Jore Bungalow during the rains. The cost of bringing some of the logs on rollers to a suitable Depôt for the convenience of purchasers, will be tested, and if found advisable, it will all be removed to Depôt.

51. Five hundred trees contiguous to the tract whence the others have been felled, will be girdled to season for future supplies.

52. It is estimated that local demands will not require more than 500 logs per year, together with the supplies extracted from the Municipal forests of Goom Pahar.

53. If this estimate prove correct, 500 logs will be felled and girdled yearly, or such stock as is found to be necessary. This will ensure, after three or four years' seasoned timber for use in the District, a desideratum very much required.

54. Above Kurseong about 200 logs yearly will be felled and two hundred trees girdled in like manner to meet local wants, and re-planting carried on as above-mentioned. In the

Terai and Teesta Valley about 2,000 logs will be brought out, and about 10,000 sleepers. There are also some 1,500 logs of Sikkim Pine *(pinus longifolia)* felled and lying on the banks of the Great Runjeet, which will be floated out. It is proposed to try and bring out Sâl from the Teesta Valley with this Pine. At least the experiment must be tried, and more efficient measures than those of last year will be required to stop timber at the Rope Stations, as the carrying away of the cane ropes caused the loss of a large quantity of timber (some 800 logs), and consequent heavy pecuniary losses to contractors who did not deliver the timber. About 1,200 Sâl logs at present at Siligoree will be floated down to Kissengunge to be ready to meet local wants in that neighbourhood. These arrangements will, it is hoped, meet all requirements in Sikkim and Bhootan.

SECTION 4.

Financial.

Collections by Civil Officers excluded in estimating results.

55. Before estimating the cash results of departmental operations, it should be observed that certain collections on forest produce other than from timber in *Unreserved forests*, are made by the Civil District Officers. These collections are finally incorporated into the Forest revenue; but as no expenditure is incurred by the Forest Department on account of them, the amounts, which are considerable, should be set apart from departmental operations when considering expenditure and receipts.

Financial results during past three years.

56. The following Statement gives the results of financial operations for the last three years:—

YEARS.	EXPENDITURE.	RECEIPTS.	CASH DEFICIT.	DIFFERENCE OF ASSETS AT COMMENCEMENT AND CLOSE OF YEAR.	NET DEFICIT.
	Rs.	Rs.	Rs.	Rs.	Rs.
1865-66 ..	35,773	3,894	31,879	11,606	20,273
1866-67 ...	1,04,429	8,866	95,563	80,003	15,560
1867-68 ...	1,65,605	19,649	1,45,956	1,09,241	36,715

	1865-66.	1866-67.	1867-68.
	Rs.	Rs.	Rs.
Collections on forest produce by Civil Officers	34,691	41,690	56,039
Deduct yearly net deficit	20,273	15,561	30,278
Net Forest revenue ..	14,418	26,129	25,761

Results unsatisfactory.

57. These results appear unsatisfactory, for they show a considerable cash deficit and also net deficit, after valuing the difference of assets at the beginning and close of the year.

58. By setting off the collections on forest produce in all Divisions against this deficit, which is the result of past operations in Sikkim alone, a net yearly revenue from forests in the Lower Provinces, as shown in the above Statement, is obtained.

Cause explained.

59. The results shown above are capable of some explanation. Expenditure has been too great, but this it is impossible to avoid at the commencement of operations when great difficulties have to be overcome, and the cause of the apparent unsatisfactory results above shown lies chiefly in that, the real value of timber brought to market has not been properly considered, and thus it has been sold and made over to public departments at very low and unremunerative prices.

Fixed rates necessary for the sale of timber at present.

60. In the absence of large local demands, except by public departments, and consequently also of local markets of any extent, it becomes necessary to fix some rates which shall fairly represent the value of timber standing in the forests.

Value of forest property not fairly estimated.

61. This value appears very generally to have been estimated at nothing, because the public, previous to the introduction of forest conservancy, were allowed to fell forests and to take what timber they wanted without payment, and they looked upon forests as yielding inexhaustible supplies which, having lasted from creation until now, would yield their supplies for ever.

62. On the introduction of Forest conservancy, a price was placed per tree on timber standing in the forests, and parties who purchased it went into the forests to fell and take it away. But the size of trees varies very considerably, as they may contain from 20 cubic feet up to 3 or 4 tons of timber, and thus the real value of timber has been very indefinite.

Enquiry into local rates and value of timber.

63. It appeared absolutely necessary that a fair valuation of timber should be arrived at, and accordingly an examination has lately been made into the prices at which local traders sold timber.

These rates were found to be such as would leave a fair value for *timber standing in the forests*, after deducting cost of extraction and expenditure to be incurred in converting it.

64. The Municipality of Darjeeling, as forest owners, were addressed on the subject with a view to a discussion of the question, so that some definite understanding might be come to by which the rates charged in their forests should approximate to Government rates, instead of their continuing to sell timber out of their forests at an average of 1 Rupee per ton, destroying their property and under-selling other forest-holders, until their forests should be exhausted; and in order also to introduce cubic measurement in all timber transactions, instead of the practice which has, up to this, prevailed of selling by the tree.

Certain fixed rates proposed.

65. The rates proposed, and which are now before Government for approval, are given in a Schedule below. They are based upon those which rule in the local bazaar, so that the public will not have to pay more for timber than they do now, and forest owners will receive a fair value for their property, instead of a few Native dealers reaping all the profits, and public departments getting timber from the Forest department at fictitious and nominal prices, by which the financial results which should accrue from the forest property belonging to Government are not properly represented.

Schedule of proposed Rates.

Kinds of Timber.	Per cubic foot delivered in the forests on a road or river* bank in the plains.		Per cubic foot for sawn timber delivered on a road in the forests or river bank in the plains.		Rates per ton.	Remarks.
	Forests above 4,000 feet.	Forests below 4,000 feet.	Forests above 4,000 feet.	Forests below 4,000 feet.		
First Class.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Walnut	0 12 0	...	...	...	37 8 0	1. * The term "in river bank" means the river bank station nearest the Hills, such as Siligoree on the Mahanuddy, Doomanee on the Teesta, Alipore on the Kaljanee, &c.
White Magnolia, Chestnut ...	0 10 0	...	...	...	31 4 0	
Red Magnolia, Oak, Booke ...	0 8 0	...	...	...	25 0 0	
Sitsal	...	1 12 0	...	...	87 8 0	2. At junction of river with Ganges or Berhampootra, special agreements for transport should be made.
Sál	...	1 8 0	...	...	75 0 0	
Chalawnee, Trop	...	1 4 0	...	...	62 8 0	
Urjun, Sissoo	...	1 0 0	...	...	50 0 0	
Second Class.						
Oak, Chalawnee	0 6 0	...	..	...	18 12 0	3. Below this, Calcutta market rates.
Cherry Lallee	0 4 0	.	...	...	12 8 0	
Seet, Amluki, Gumber ...	...	0 3 0	...	...	9 6 0	
Bamboos, for 1,000† ...	...	3 0 0	...	...	...	
All other trees	...	0 1 0	...	.	3 2 0	

Command of labour.

66. Hitherto, private parties, and even the Municipality, have not been able to command labour for sawing timber, and they have been in the hands of a few sawyers. But the Forest Department, owing to their larger operations, are able to control the sawyers and bring down rates to a proper standard, and this will enable the Department, without raising the prices of timber required by the public, to obtain a fair value for Government timber.

67. The following will illustrate the subject:—

Illustration of the subject.

Converted timber, which is paid for at the rate of about 1 Rupee per ton in the Municipal forest, is sold in Darjeeling bazaar at an average of Rs. 40-12-6 per ton.

The Forest Department can convert and deliver at Darjeeling at an average of Rs. 17-7-2 per ton. This rate is much lower than that generally paid, and the Forest Department should derive the advantage of any good management which has conduced to this result.

† Cut in the Forests by purchasers.

The difference,* *viz.*, Rs. 23-5-4 per ton, should represent the value of the rough timber felled and stacked by the Department, and this would give a very fair value for the timber standing in the forests, after deducting cost of extraction, which in the Temperate forests at present is not large.

* Rs.	A.	P.
40	12	6
17	7	2
23	5	4

68. Now, during the past year, 3,407 tons of Oak, Magnolia, and Chestnut (some of it converted) have been made over to the Public Works Department at an average rate of Rs. 15-10 per ton; whereas Rs. 23-5-4 would have been more properly the average rate, and one which, taking the value of wood all over India, cannot be considered high. This would make a difference of some Rs. 24,000 in the Forest revenue for the year to be derived from this transaction alone.

69. Under the past system of making over timber, the financial advantages which ought to have accrued to the Forest Department arising out of large transactions, and its ability to master labour and get work done at reasonable rates, have gone to credit elsewhere, while the real value of timber, and the advantages of bringing it to market at lower rates than formerly charged, have not been recognized.

Rates for timber in a few tracts of forest which are in private hands, not real standard of value.

70. It may not be out of place here to remark that there are still a few acres of land here and there covered with forest which are in the hands of private individuals. Not knowing the value of the timber standing on their lands, and being unwilling or unable to extract it themselves, it is sold at low rates, which are sometimes brought forward as those at which timber and shingles can be obtained, and contrasted with the proposed rates now submitted to Government; but supplies of this kind are very limited in extent, inferior in quality, and in some instances grow in localities whence extracting them is difficult (points which are conveniently overlooked at times), and the rates paid for these uncertain and limited supplies are no standard by which to value the timber of the District.

Forest collections yearly increasing.

71. It is satisfactory to observe that the collections on Forest produce are annually increasing, and there is every reason to believe that they will yet increase considerably, as they attract more attention, before they attain to an average amount.

72. It is proposed to raise the rate charged for licenses to cut firewood from 8 annas to 1 Rupee per month, and to reduce the cost of collection. Firewood-cutters earn a very good livelihood by their trade. Enquiry has shown that the present rate is out of all proportion to the wood removed, and that the increased rate will not bear hard upon them.

73. In conclusion, it may be observed that every effort will be made to balance receipts and expenditure, so as in future to reduce the cash, as also the net yearly deficits which have been the results of Departmental operations.

SECTION 5.

General.

Appointment of Conservator.

74. The present Conservator joined his appointment on the 12th November, and during the dry season visited the following Districts:—

Journeys during past season.

75. At the end of November he proceeded to Sikkim to inspect the operations carried on in the Teesta Valley. During January and February he travelled over parts of the Chittagong Districts, and submitted a report to Government on the introduction of Forest conservancy in that Division.

During April the Western Dooars as far as Buxa were visited, and a report submitted regarding the Forests of that District.

Next season's inspection tours.

76. Next dry season it is proposed to spend the greater portion of the year in travelling in Assam and the neighbouring Districts.

Communications and Buildings.

77. In the Terai a fair-weather road, four miles in length, between Adulpom and the Sookna road, was opened out, and another eight miles in length between the Sivok Road and Saragolah, leading direct to Siligoree, by which the carting of timber from the foot of the hills was greatly facilitated. Along the foot of the Hills from the East bank of the Teesta to the Dalimkote Road, a fair-weather track was cleared and travelled over. This greatly facilitates inspection of the Division in the Western Dooars, as it obviates the necessity for going round by Julpigoree. Various cart tracts were cut, and repairs to roads executed.

Besides these communications, a difficult road, made the previous year in the Teesta Valley, was kept open and continued so as to join the Municipal road from Darjeeling, where it crosses the Teesta on the way to Damsong. This road is the only one by means of which the forests of the Teesta Valley can be worked, and is very generally used by Natives from all parts of the Hills. The cost of making and repairing, which is considerable, has hitherto been borne by the Forest Department. The keeping open of this line of communication as

an Imperial road, might properly form subject of report by the Local Authorities, it being generally spoken of as one which might become a line of considerable traffic, and the expense of keeping it up should not be borne entirely by this Department.

Different races employed as workmen.

78. It may not be uninteresting to mention the remarks the Assistant Conservator makes regarding the people employed as workmen in these localities. He states that the Nepalese who come direct from the Nepal Hills after they have gathered in their crops, and leave again in spring, form the largest portion of workmen. The Lepchas who inhabit the Hills are sometimes employed on road work, rafting and plantations, but are few in number and cannot be depended on. The Meechees, a wandering agricultural race, who live immediately at the foot of the Hills and on the produce of their crops, can scarcely be prevailed upon to work. Besides these, there are many "Dangers," a strong, well-made race of people, who come from the Rajmehal District. They readily take employment, and are by far the best workmen in the Terai.

Future prospects.

79. Taking a general view of the financial prospects of the Forest Department in the Lower Provinces for some years to come, our expectations should be very limited. So far as present knowledge of the forest goes, it is everywhere apparent that wherever timber could be removed with profit, almost everything available has been taken away, and the greatly decreased size of the timber which now generally comes from the forests shows the state to which they have been reduced.

Large timber scarce.

80. Timber of any size is now only to be found in tracts situated at immense distances from places of consumption, whence its extraction, from the nature of the country and rivers, added to its not floating, renders the work difficult and expensive.

General knowledge of the forests in the Lower Provinces still very limited.

81. The knowledge of the forests of the Lower Provinces which could be obtained during the past short season, is necessarily very slight. It will probably be possible in the next report to lay before Government a map and statement which will give a fair general idea of all the Government forest lands in these Provinces, together with probable results to be expected; but this cannot be done now with any practical advantage.

Conclusion.

82. There is of course much to do before a working Forest Conservancy Establishment can be introduced in all the districts and over all the forests where it is required, and the cordial co-operation of all District Officers is essential to diffuse among the people an idea of what the objects and reasons of forest conservancy are. In a country where every one has been permitted to fell timber almost entirely without restriction or payment for a long series of years, people are apt to look upon forests as inexhaustible, and timber of little or no value, estimating it only at the cost which must be incurred in fetching and converting it for use.

This idea finds such general expression even by those who, as Railway Contractors, ought to know better, that a short note given below was published on the subject, and is appended here, as it may possibly be the means of throwing some light on many points which are very little understood.

Note on Forest Conservancy.

It may with truth be said that the science of Forestry, still in some measure emperical in its nature, has been introduced into no country until the forests of that country had been well nigh brought to the verge of total destruction. It has nowhere been the result of superior wisdom or foresight on the part of the Rulers of such country, but rather the consequence of a gradual falling-off of supplies, and, in many localities, absolute want of the produce of the forests which, felt gradually more and more by the whole body politic, has at length attracted the attention of Government and caused the framing of measures calculated to retrieve past errors or neglect, stay further destruction and waste, and relieve the present and protect future generations from absolute famine.

The causes of the gradual destruction of forests may be traced to a general idea very prevalent even at this present time in those countries and provinces where conservancy is still in its infancy, that as forests have existed from their first creation until now, they must be, so to speak, inexhaustible, and that as nature provides for their reproduction, there is no fear of their ever failing. But those who entertain such ideas—they cannot be called opinions—do not consider that, as population increases, so the areas covered by forests diminish. As new wants arise, such, for instance, as timber for Railways, extra and heavy demands fall upon forests, the produce of which was probably used formerly for little else than local wants. As means of transit become more easy, so forest districts are made to supply the wants of localities where there is no growing timber.

The results of this gradually changing state of things are certain, but not apparent immediately, either to those who live near forests, and have from time immemorial been in the habit of going to them for such supplies as they required, and at no cost for the timber except what had to be spent in extracting and converting it, or by those who, living at a distance from where their supplies came, knew nothing about the localities whence those supplies were drawn, and cared less.

The people who inhabit or frequent forest districts, as also timber cutters, are not of that educated and intelligent class which would make much observation as to the remaining stocks of timber in the forest, or calculate how long they would be likely to last. They would go on cutting and wasting, looking only to the present, so long as their operations produced for them their livelihood and fed their wants. They would take no note of the gradual encroachments made from time to time by clearing any portions of forest for the purposes of cultivation; they would take no note of the growing scarcity of mature and full-sized timber in the forests; they would go on felling, the timber gradually decreasing in size, and this would continue until consumers and traders, finding they could no longer get the size of timber they required, while prices were rising, would at length become alarmed, and institute enquiry which would open their eyes to the fact that timber was getting scarce, the result of overworking and mismanaging the forests which, in consequence, were fast being destroyed. The examination of the forests would now follow. Former practices which led to their destruction would be stopped, while such measures would be carried out as would husband the stocks still existing, and ensure increased supplies for the future.

These measures, however restrictive in their nature, would be now felt by those who, up to the time of their introduction, had had free timber, and the usual consequences would ensue; complaints would arise on all sides; the community is now sorry it ever spoke; all kinds of pressure is put on by interested parties, and Government have to use the greatest firmness to combat these and enforce the measures they have been compelled to introduce.

Few, if any, persons go into forests periodically to watch and examine them, yet without such visits and examination no idea can be formed regarding their state and value. At a distance the country appears to be covered with a dense mass of trees, and this being the case after centuries, the idea is formed that there must be an inexhaustible supply of timber. Such, however, is far from being the case. The proportion of valuable and useful trees may form but a very small percentage of the trees in the forest, by far the larger portion of the remainder being, perhaps, unfit even for good fire-wood.

The next and most important subject which receives no attention is the reproduction of forests. This is natural, and arising out of the first view before mentioned, together with a want of general information regarding the destruction which has been and is going on under a false impression of perfect security.

Looking to India alone, where until lately has re-planting, except in isolated and very minute instances, been carried on, while all the time thousands of square miles of forest have been swept from the face of the earth? In India, more than in any other country, perhaps, are these operations required owing to the nomadic inclinations of a large proportion of its inhabitants in forest districts, and the destructive nature of their hill cultivation which clears away mile after mile of valuable forest, for unfortunately the best land is generally also where the best forest grows. It is surely time these people had a check put to their operations, and were made to re-plant where they had already cleared the country, instead of allowing such immense tracts as they have cleared to be waste and overgrown with useless scrub. There is ample, and much more than ample, for all their wants, if they were manifold more than they are. Natural reproduction in forests, with but few exceptions is very limited, as the examination of forests clearly shows. The limits of this article forbid further remark on this subject than to state, in addition to what has just been said, (contrary to a prevailing idea) that, as a general rule, forest land once cleared if left to itself, reproduces nothing but the most worthless jungle and undergrowth, unfit for use of man or beast, and most difficult to eradicate again from the soil.

It has already been observed that previous to the introduction of Forest conservancy, the value of timber standing in forests is not considered at all, the expenses incurred in its removal and conversion for use alone being taken into account. This arises from the same false starting point—that forests are inexhaustible. The consequence of this is, that valuable woods are used for fire-wood, and every trifling or temporary purpose, where woods of an inferior description and abundant would be just as good for many purposes. In connection with this subject is the use of green instead of seasoned wood.

Timber used in its green state may last six to eight years; but if properly sensoned, would probably remain sound for forty years at least. This being the case, the use of green timber is equivalent to the consumption of five or six times the quantity of timber which should be used, and by which the forests are drawn on unnecessarily to that extent. This, however, is not the only waste, as all the labour of conversion and fitting, together with other materials used with it, are wasted and paid for five or six times over. Some places might be mentioned where most important works are being carried on, the construction of which has taken years, and they are not yet finished, yet not one cubic foot of seasoned timber has been or is being used, and in fact, scarcely an inch of seasoned timber exists in the whole district, except such as is lying in the forests in the shape of tops of felled trees, and trees dead from natural causes. It will take three years at least before seasoned timber can be introduced. An apology seems almost necessary for bringing forward such home truths; but they are much more generally ignored or unknown than is supposed in this country. The value of seasoned timber is unrecognized, and whole communities resent it as a grievous injury if they are told that valuable timbers fit for building purposes should not be cut up into chips for fire-wood, which exists in abundance in the neighbourhood.

The absolute necessity that exists for Forest conservancy has now been felt all over Europe, and is being felt all over India. The Lower Provinces of Bengal have latterly been taken in hand. Though too late to save forests of incalculable value from almost total destruction, there is yet time for the saving of much valuable forest country, and it will require the strong support of Government to carry out the measures considered necessary to retrieve past, and arrest further destruction of their forest property. Local pressure will necessarily arise against conservancy on the part of the public, and complaints from the indigenous inhabitants of districts, whose free use of timber standing in the forests will be interdicted groundless, though they will appear on examination, nevertheless receive support until the real necessities for conservancy are understood.

When it is considered that in Europe wisdom and foresight were not of a nature to apprehend the destruction of forest property which was going on until many districts and lands which had formerly been thickly populated and covered with rich forests had been converted into bare rocks and arid plains, which cannot now support life in a few herds of cattle or flocks of sheep, it is scarcely to be wondered at that in India similar destruction has taken place, and is even now going on.

It will not be long before the scandalous destruction of timber on tea estates, the consequence of shameful ignorance, will cause the owners to feel that which they are now only first beginning to think may come upon them, *viz.*, want of wood for their tea boxes. When this time comes they will change the views they now hold regarding the value of standing timber, begin to understand what Government has been doing for the general good, and feel grateful perhaps that their future wants, among others, have not been overlooked.

FOREST DEPARTMENT, BENGAL.

Annual Account of Outstandings against Contractors for 1867-68.

Particulars.	Outstanding on 1st April 1867.	Advanced during 1867-68.	Total.	Recovered in 1867-68.	Balance outstanding on 31st March 1868.	Remarks.
	Rs. A P	Rs. A. P.	Rs. A P.	Rs. A P.	Rs. A. P	
Carting timber	7,000 0 0	15,434 9 0	22,134 9 0	5,879 11 0	16,554 14 0	
Sawing timber	201 12 9	45,971 7 5	46,173 4 2	38,886 5 8	7,286 14 6	Outstanding 30,896 7 11
Felling and floating timber	250 0 0	43,947 12 2	44,197 12 2	39,371 3 0	4,826 9 2	Liabilities 1,871 12 0
Communications..	...	5,857 15 0	5,857 15 0	5,504 8 9	353 6 3	Difference 29,021 11 11
Total .	7,451 12 9	1,11,211 11 7	1,18,663 8 4	89,641 12 5	29,021 11 11	

Statement of Timber brought to Depôts from the different Forest Divisions during 1867-68.

Name of River or Division.	Forest.	Description of Timber.	Pieces.	Cubic Feet.	Total of each River. Pieces.	Running feet.	Cubic feet.	Remarks
Sikkim Division Temperate and Tropical Forests.	Godagaree ..	Sâl	368	8,418	No.			
		Sissoo	51	408	419	...	8,826	
	Siligoree ...	Sâl	142	3,248				
		Sleepers ...	9,261	31,513				
		Planks	1,200	3 025	10,603	...	37,786	
	Sookna ...	Sâl	1,268	29,005				
		Sleepers	18,853	64,152				
		Planks ...	303	763	20,424	...	93,920	
	Mahalderam	Sleepers ...	600	2,040	600	..	2,040	
	Old Darjeeling Road.	Oak and Magnolia	3,743	128,352				
		Sleepers	1,924	6,546	5,667		1,34,898	
	Jore Bungalow	Shingles	470,110	87,910	470,110	..	87,910	
		Sâl Saplings .	8		8	..	...	
	Siligoree ...	Scantlings	320	86				
		Chuttackpore	36,164	9,764		36,184	9,850	
	Total	Number of pieces ..	. .	...	507,831			
		Running feet ..	...	...		36,184		
		Cubic feet ...	...	...	..		375,230	

C. F. Office, L. P., Bengal; Darjeeling, *The 1st September* 1868.

H. Leeds,
Conservator of Forests, L. P., Bengal.

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FOREST DEPARTMENT, BENGAL.

Annual Timber Account for 1867-68.

Particulars.	Logs.	Sleepers.	Planks.	Shingles.	Scantlings, Running feet.	Pieces.	Totals.
I. Stock in hand at the following Depôts at the commencement of the year :—							
1. Siligoree	639	3,976	100	...	...	4,715	
2. Sivok	.	2,046	...	...	...	2,046	
3. Sookna	3,009	108	...	...	...	3,117	
4. Mahalderam	...	535	...	...	...	535	
5. Runghool	...	475	...	...	...	475	
6. Old Darjeeling Road ...	1,056		...	...	...	1,056	
7. Teesta	...	534	...	...	...	534	
							12,478
II. Timber received at Depôts from the Forests :—							
Godagaree	419	...	...	...	...	419	
Siligoree	142	9,261	1,200	...	320	10,603	
Sookna	1,268	18,853	303	...	...	20,424	
Mahalderam	.	600	...	...	...	600	
Old Darjeeling Road ...	3,743	1,924	...	...	...	5,667	
Sâl Saplings	8	..	...	...	...	8	
Jore Bungalow	..	...	...	470,110	...	470,110	
Chuttackpoor	...	...	...	...	36,164		
					36,484		507,831
Number of pieces ...	...	...	...	...	...	...	520,309
Scantlings, Running feet	...	...	...	...	...	...	36,484

Particulars.	Logs.	Sleepers.	Planks.	Shingles.	Scantlings, Running feet.	Pieces.	Totals.
I. Timber removed by purchasers from Depôts :—							
	5,128	6,812	490	168,250	35,619	180,680	
II. Timber lost and used by the Department :—							
	432	396	...	...	...	828	
							181,508
III. Stock in hand at the close of the year at the following Depôts :—							
Godagaree	419	...	...	...	...	419	
Siligoree	88	9,400	810	...	...	10,298	
Sivok	.	114	...	...	...	114	
Rhonee	...	100	...	...	...	100	
Sookna	4,217	18,961	303	...	...	23,481	
Mahalderam ...	...	132	...	...	...	132	
Teesta	...	2,324	...	...	...	2,324	
Domanee	...	69	...	...	...	69	
Runghool	...	4	...	...	...	4	
Jore Bungalow ...	...	...	...	301,860	...	301,860	
							338,801
Old Darjeeling Road .	...	...	...	...	199		
Chuttackpoor ...	...	...	...	...	666		
					865		
Number of pieces ...	...	...	...	...	...	...	520,309
Scantlings, Running feet	...	...	...	...	...	...	36,484

C. F. Office, L. P., Bengal;
Darjeeling,
The 1*st September* 1868.

H. LEEDS,
Conservator of Forests, L. P., Bengal.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount realized on account of the different classes of Timber sold during 1867-68.

Division.	Number of Logs sold.	Cubical contents.	Amount realized and due on account of Timber sold.	Average amount per Log.	Average cubical contents of Logs.	Average amount per 100 cubic feet.	Remarks.
		Cubic feet.	Rs. A. P.	Rs. A. P.	Cubic feet.	Rs. A. P.	
Sikkim.							Pieces.
Sleepers 10′ × 10″ × 5″	5,549	18,882	11,327 4 0	2 0 8	3 4 10	59 15 0	Timber sold in previous years remaining unremoved at the commencement of the year.
Bhootan.							
Confiscated and waif timber	...	...	164 5 0	...	...	...	Timber sold during the year ... 5,549
Total	...	...	11,491 9 0				
Deduct amount due, but not realized during the year	...	...	318 8 5	...	...	...	Timber remaining unremoved at the close of the year.
Balance	...	...	11,173 0 7				
Add amount realized on account of former years ...	...	...	* 742 1 0	...	...	...	Balance removed from Depôts by purchasers during the year.
Total shown as Revenue on account of Timber sales	...	...	11,915 1 7				

* This amount, Rs. 742-1-0, which forms part of Rs. 935-8-7 credited in March's account as Revenue under I., should properly have appeared as refund of amount paid for floating sleepers.

C. F. Office, L. P., Bengal;
Darjeeling,
The 1st September 1868.

H. LEEDS,
Conservator of Forests, L. P., Bengal.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount expended on account of Timber received from the different Forest Divisions during 1867-68.

Name of Division.	Number of Logs.	Cubical Contents.	Timber expenses.	Conservancy expenses, cost of Establishment, &c., of the Department, excluding Direction.	Total amount expended, excluding Direction.	Average amount paid per Log.	Average cubical contents per Log.	Average amount paid per 100 cubic feet.
		Cubic feet.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Cubic feet.	Rs. A. P.
Logs	5,580	169,431	52,273 6 0	6,520 0 0	58,793 6 0	10 8 6	30 4 4	34 11 2
Sleepers	30,638	104,251	38,330 5 0	4,010 0 0	42,340 5 0	1 6 0	3 4 10	40 9 9
Planks	1,503	3,788	2,078 2 0	315 6 0	2,593 8 0	1 9 5	2 6 3	63 3 0
Shingles	470,110	87,910	1,410 6 0	250 9 0	1,660 15 0	3 8 6 per thousand.	187 0 0 per thousand.	1 14 2
Scantlings, Running feet ...	36,484	9,850	2,189 0 0	253 0 0	2,542 0 0	6 15 5 per hundred running feet.	27 0 0 per hundred running feet.	25 12 10
Total Pieces	507,831	375,230	96,281 3 0	11,448 15 0	1,07,730 2 0	... .	....	.....
Total Running feet ..	36,484							
Add Direction charges ..	...	..	.....	.....	2,865 2 0	. ...	....	. ...
Grand Total ..	.	.. ..	. ..	.....	1,10,595 4 0	. . ..	.. . . .	... ..

Remarks.		
Abstract rate per 100 *Cubic feet.*		
	1866-67.	1867-68.
	Rs. A. P.	Rs. A. P.
Timber Expenses ..	.....	25 10 6
Conservancy and Establishment	.....	3 1 0
Direction	.. ...	0 12 0
Total ...	.....	29 7 6

Note.—1. Outstanding advances made to Contractors on account of felling, floating, sawing, and carting are not included in the column of "Timber Expenses," as the amounts were not expended on those operations at the close of the year.

2. Expenditure under A. II.—"Feed and keep of Cattle," and B.—"Establishments," is shown as "Conservancy Expenses" in the next column.

3. A proportion of one-third of Direction charges is taken as chargeable to Timber in this Division.

C. F. Office, L. P., Bengal;
Darjeeling,
The 1*st September* 1868.

H. LEEDS,

Conservator of Forests, L. P., Bengal.

FOREST DEPARTMENT, BENGAL.

Annual Account of Forest Revenue for the year 1867-68.

	Rs.	A.	P.
Receipts	19,648	10	10
Expenditure	1,65,605	8	0
Deficit ...	1,45,956	13	2
Subtract difference between Assets and Liabilities at commencement and close of the year	1,15,678	11	0
Net deficit ...	30,278	2	2

NOTE.—Besides the above sum, which shows the actual Departmental transactions during the year, the receipts collected on Forest produce by District Civil Officers, amounting to Rs. 56,039-4-6, have to be added, showing a net revenue of Rs. 25,761-2-4 for the year.

Detail of difference between Assets and Liabilities at commencement and close of the year.

	At commencement of the year.	At close of the year.	Difference. In favour of the year.	Difference. Against the year.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Value of Timber and other Stock	*88,175 0 0	1,27,761 2 2	39,586 2 2	.....
Outstanding on account of Sales, Public Works Department ... Rs. 54,204 1 3; Darjeeling Municipality ... 318 8 5	... .	54,522 9 8	54,522 9 8	.....
Outstanding on account of advances made to Contractors	7,451 12 9	29,021 11 11	21,569 15 2	.....
Total Assets ...	95,626 12 9	2,11,305 7 9	1,15,678 11 0	.....
Deduct Liabilities ..	.....	. . ...	.....	.....
Balance	95,626 12 9	2,11,305 7 9	1,15,678 11 0	.....

* Valuation of Timber on hand and Stock in 1866-67 was given in last Report as Rs. 1,19,987-6-3. How this estimate was arrived at was not shown, and number of cubic feet was not given. In order to compare 1866-67 with 1867-68, the former year's Timber and Stock in hand has been estimated at same rates as in Valuation Statement which accompanies.

H. LEEDS,

The 1*st September* 1868. *Conservator of Forests, L. P., Bengal.*

No. 665, dated 17th February, 1869.

RESOLUTION,—By His Honour the Lieutenant Governor of Bengal.

The present Report deals only with the forests in British Sikkim and Bhootan, to which the attention of the Department has hitherto been mainly directed.

2. These forests may be divided into two classes—the Temperate forests situated on the hills, and the Tropical forests in the plains.

3. In British Sikkim specific tracts have been reserved, and the entire control of them, under rules dated 15th August 1866, has been placed in the hands of the Department.

British Sikkim, Temperate Forests.

4. The timber now existing in British Sikkim is to be found chiefly in the Temperate forests, from an elevation of 6,000 feet above the level of the sea upwards. The tract between an elevation of 3,000 and 6,000 feet has been almost denuded of timber by the clearances of native cultivators and tea planters. The distance of these temperate forests from the plains is said to forbid the possibility of working them remuneratively so as to supply distant markets, though they provide timber for local purposes.

Tropical Forests.

5. The Tropical forests of British Sikkim, although denuded of large timber, are said to be rich in young trees, and to promise to become very valuable if properly conserved. It appears however, from para. 19 *et seq.* of the report, that it is extremely difficult to bring out in the shape of logs even such

large timber as is still remaining, all the accessible timber fit for sleepers having already been taken out by the contractors, who "only stopped when, having exhausted the forests in the plains, they found those on the hills presented little chances of gain."

6. With reference to para. 24, the Lieutenant Governor will be glad to learn that the result of the experiment of sending logs for sale in Calcutta down the Mahanuddy has been such as to encourage the despatch of further supplies by that route. It would be in every way advantageous that timber produced in those forests should be able to compete in the Calcutta market with foreign timber from Nepal, but this must be effected by reductions in the cost of production and transport. The Lieutenant Governor does not suppose that, in the remarks in this para., the Conservator contemplates the imposition of transit duties on foreign timber for the purpose of enhancing its price, so as to enable the produce of the Government forests to compete with it.

Bhootan Dooars, Temperate Forests. Para. 7.

7. The Temperate forests of Bhootan had not been explored up to the end of the year under review. They are said to be almost inaccessible.

Tropical Forests. Para. 25 *et. seq.*

8. The Tropical forests of Bhootan are reported to be better stocked with mature timber than those of British Sikkim, although the powers of these also have been over-taxed, and they require much care in future.

Forest rules, and demarcations.

9. With reference to para. 27, the Lieutenant Governor observes that the preparation of a set of rules in connection with the Bhootan forests has been the subject of constant correspondence, and of frequent conferences during the year 1868. The demarcation of the forests, and the adjustment of the limits of the authority to be exercised by the Forest Department, so as to ensure the proper protection of local rights and privileges, has been found a most difficult matter, and one on which it has been impossible to bring the Forest Officers into accord with the Commissioner and the Officers of the Civil Administration. From a Resolution of the Government of India, Department of Public Works, No. 409, dated 28th November 1868, the Lieutenant Governor finds that similar difficulties and differences of opinion have been experienced in the Central Provinces and in Oudh. Certain principles have been adopted by the Government of India in that Resolution which will facilitate the decision of the question by the Lieutenant Governor. The draft of an Act is now before the Legislative Council of the Governor General, the provisions of which will remove the difficulty which has been felt for providing for the prompt and equitable decision of local claims.

Section 3, para. 42.

10. The Lieutenant Governor regrets to observe the unfavourable mention which is made of the conduct of the officer who was in charge of forest operations in the Western Dooars. He has been dismissed.

Para. 43.

11. In reply to a call made on his preliminary report, the Conservator has explained in his letter No. 36, dated 21st October, that the right to cut timber for five months was sold; and that, owing to the culpable negligence of the Officers referred to above, no restrictions were placed on the operations of the purchasers who did much mischief.

Valuation of stocks of timber. Para. 48.

12. In the valuation statement of timber in hand at the end of the year, the Conservator takes the actual cost of production only, which amounts to Rs. 1,25,186-2-2. It would have been well if he had, however, roughly estimated the actual value at the prevailing market rates.

Income and expenditure of the year. Section 4.

13. From the figured statement given in para. 56, it appears that the actual expenditure of each of the last three years in British Sikkim and the Western Dooars, and the actual cash receipts on account of timber sold, and other revenue which is collected by the Department, has been as shown in the margin. It was to be expected that while the Department is so young, and so much has to be done in the way of organization before profits can be realized, the expenditure should for some years be increasing, and much in excess of receipts. Against the cash deficit of each year, the Conservator sets off the sums shown in column 5 of his statement which is headed "Difference of assets at commencement and close of year." It has been ascertained from the Conservator that, for the year 1867-68, the figures in column 5 should be Rs. 1,15,678-11 (instead of Rs. 1,09,241 as erroneously given in the report), and from a table given on page 18 of the printed report, it appears that this amount is made up as shown in the margin. Giving credit for this amount to the year under review, the actual deficit of the operations of the year is reduced to Rs. 30,277-4-2.

1	2	3	4
YEARS.	EXPENDITURE.	RECEIPTS.	CASH DEFICIT.
	Rs.	Rs.	Rs.
1865-66 ...	35,773	3,894	31,879
1866-67 .	1,04,429	8,866	95,563
1867-68 ...	1,65,605	19,649	1,45,956

	Rs. A. P.
Estimated value of timber in store at close of 1867-68 in excess of the estimated value of that in store at the beginning of the year ...	39,586 2 2
Debts due to the Department in excess of those due at the beginning of the year	76,092 8 10
Total ...	1,15,678 11 0

14. These calculations are, however, of little value. From the note to the table in page 18, it appears that the stock in hand at the beginning and at the close of the year under review has been estimated, not with reference to actual market value, that is, to the price which could actually be realized by selling the stock to traders, but as explained in para. 48, upon the actual expenses incurred on the timber. It is to be hoped that the timber, if sold, would realize a far higher price, and if so, the Department might fairly take credit for such prices on timber supplied by it to other Public Departments. What the real market value of the timber may be it is not easy to conclude; in para. 67 the Conservator asserts that converted timber is sold at an average rate of Rs. 40-12-6 a ton in the Darjeeling Bazaar; but it appears from paras. 64 and 70 that the Darjeeling Municipality, as well as the proprietors of local forests, sell their timber as it stands in the forests at rates which leave a very excessive margin to the dealer who cuts, transports and converts it. It is strange if the local proprietors, who have the best opportunities of knowing and judging what is the real profit realisable from their property, allow their interests to suffer in this way. On the other hand, it is remarkable that where there is no large local demand (as stated in para. 60), the timber sold can command so large a price in proportion to the cost of its production. Since, however, the close of the year to which this report refers, the correspondence noted in the margin has taken place, in which the Government has left it to the Conservator to fix such prices for timber supplied on indent to Public Departments as may seem to him reasonable. In the absence of complaints of overcharge from the Departments supplied, the rates so fixed may be assumed to be fair.

Valuation of timber.

Conservator, to Government, No. 28A, dated 23rd July 1868.
Commissioner of Cooch Behar, to Government, No. 2524, dated 30th September.
Conservator, to Government, No. 42, dated 3rd November.
Government, to Conservator, No. 3927, dated 28th November.

15. The mode of pricing the trees without reference to their size, as referred to in para. 62, was, it is presumed, a rough and provisional expedient adopted by the Forest Department on the first introduction of measures of conservancy.

16. The statement contained in para. 66 is to the effect that, while the demand for their labour was small, the sawyers commanded their own terms, but that when the demand became large, they came under control; this is not what was to be expected.

17. In para. 55, the Conservator refers to the collections from forest produce which are made by Officers other than those of the Forest Department, and in para. 56, he shows that those collections are increasing year* by year. The Lieutenant Governor desires to have details of these collections, and of the forests in which they are realized. From para. 58 of the report it would appear that the sum of Rs. 56,039 in 1867-68 represents the collections on this account from all Divisions; if so, the amount cannot properly be taken as a set-off against the cost of the management of the forests in Sikkim and the Bhootan Dooars only.

	Rs.
* 1865-66	34,691
1866-67 ...	41,690
1867-68	56,039

18. The proposal in para. 72 is one on which the Lieutenant Governor can form no opinion without a fuller explanation of the circumstances than is now given. It should be made the subject of a separate communication.

Para. 72.

19. The question of maintaining the road that has been constructed by the Forest Department between the Teesta Valley and the Darjeeling Municipal Road, will be considered in the Public Works Department.

Para. 77.

20. The remarks in paras. 79 and 80 are not very encouraging as to the early prospect of good financial results in the forests now reported on, but the Lieutenant Governor hopes that, as more knowledge is gained of other forests, it will be found that their condition is more promising.

No. 665.

Copy forwarded to the Conservator of Forests, Lower Provinces, for information, with reference to his letter No. 33A, dated 13th October 1868.

No. 468F, dated 5th October, 1869.

From—The Government of India, P. W. Dept.,

To—Secretary to the Government of Bengal, in the Revenue Dept.

I am directed to acknowledge the receipt of your letter No. 1230, dated 25th March last, forwarding the Annual Progress Report of the Forest Department in Bengal for 1867-68.

2. This is the first Report submitted by Mr. H. Leeds, the present Conservator. The orders of the Bengal Government are recorded in their Proceedings for April; in future, they should be submitted with the Report.

The Report deals only with the Sikkim and Bhootan Forest Divisions, the forests in the other Divisions not having yet been made over to the Forest Department.

As required in the orders on last year's Report, a Statement of the area of the Reserves is given. This statement should be completed as the demarcation of State forests progresses.

3. The yield of timber from the Sikkim Division is reported to have been 375,230 cubic feet. The felling and removal of timber from the Bhootan Dooars was not apparently controlled by the Forest Department during the year under review.

4. The Conservator's remark, that the Municipality under-sell the Government forests by letting purchasers have timber in the Municipal forest at the rate of about one Rupee per ton of 50 cubic feet, appears to merit attention. If Mr. Leeds' views are correct, the exhaustion of the Municipal forests appears inevitable. His Excellency in Council desires to be informed whether these forests were transferred to the Municipality absolutely without any restrictions, or whether Government has retained certain rights of control and supervision, and whether this supervision should not be exercised by the Forest Department.

5. The financial operations of the year have resulted in a cash deficit of Rs. 89,918, even after taking credit for the Forest revenue realized by District Officers, the propriety of doing which, it is observed, the Government of Bengal does not admit, because the amount cannot properly be taken as a set-off against the cost of the management in Sikkim and the Bhootan Dooars.

But the Governor General in Council observes that this appears hardly a correct view of the matter. The revenue under the head of Forests should primarily include all income derived from forest lands or produce, irrespective of the precise system of supervision. But even taking a narrower view, the duties of the Conservator have begun to extend to the forests of Bengal generally. He was engaged during part of the year in examining the Chittagong forests, and it appears evident to His Excellency in Council that all forests which have not yet been transferred to the Forest Department should be managed by the Officers of the Civil Department under the Conservator's advice and with his assistance.

6. Including, therefore, the Forest revenue reported as realized by District Officers, the financial results of the year would appear to have been as follows:—

			Rs.	Rs.
Receipts by Forest Department		...	19,648	
„ by District Officers	...	...	56,039	
				75,687
Charges		...	...	1,65,605
Cash deficit		...	...	89,918
Outstandings.—	At commencement of the year ...	Rs. 7,451		
* On account of sales ... Rs. 54,522	At close of the year	83,544*		
Contractors .. 29,022				
83,544	Difference in favour of the year	...	76,093	
Value of stock on hand—				
At beginning of the year	...	88,175		
At close of the year	... ...	1,27,761		
Difference in favour of the year	...	...	39,586	
Total increase of assets in favour of the year ...				1,15,679
Net revenue, 1867-68	...			25,761

7. The Annual Cash Account, and the Summary of Receipts and Expenditure (Forms 21 and 22), are wanting. These returns were submitted with the Budget, but they should accompany the Report also, the financial portion of which is not intelligible without these statements.

The statement of Timber brought to depôts, and the annual timber account, are usefully arranged. Forms 26 and 27, exhibiting the Receipts and Charges on account of timber sold, should be modified and considerably simplified; as at present arranged, they do not clearly show what is wanted.

The Annual account of Forest Revenue (Form 28) should in future include the entire revenue of the forests, whether realized by the Forest Department or by District Officers. The Governor General in Council desires that more attention be paid by the Conservator to a clear representation of the result of the different forest operations. The annual Forms which have been prescribed, 21, 22, 23 and 28, must of course be maintained; but those which are suggested only should be modified so as to suit the requirements of the Province.

8. The Report was received on 5th April 1869, it was due on 1st August 1868. I am directed to state that a punctual compliance with the orders of the Government of India in this respect must be insisted upon.

9. A copy of the Report, the orders of the Bengal Government, and of the Government of India, will be submitted to Her Majesty's Secretary of State.

PROGRESS REPORT

SECRETARIAT LIBRARY

OF

FOREST ADMINISTRATION IN BENGAL

FOR THE YEAR 1868-69.

Calcutta:

PRINTED AT THE BENGAL SECRETARIAT PRESS.

1869.

No. 254.

FROM

LIEUTENANT W. STENHOUSE,

Officiating Conservator of Forests, Bengal, L. P.,

To

THE SECRETARY TO THE GOVERNMENT OF BENGAL,

FORT WILLIAM.

SIR,

I HAVE the honor to forward the Progress Report of Forest administration in Bengal for the year 1868-69.

The map of the Lower Provinces, referred to in the report, will be despatched in a day or two.

The annual Financial Statements were forwarded with the preliminary report on the 30th of June last, but a corrected copy of Statement No. VIII. is now submitted. The other Statements require no alteration.

The Budget Estimates of the Forest Department for 1870-71, and a brief explanatory report on the contemplated operations for that year, were forwarded to the Accountant-General on the 9th instant.

I have the honor to be,

SIR,

Your most obedient Servant,

WM. STENHOUSE, *Lieut.*,

Offg. Conservator of Forests, Bengal, L. P.

CONSERVATOR OF FORESTS' OFFICE,
BENGAL, L. P.,
DARJEELING,
The 14th September 1869.

Progress Report of Forest Administration in the Lower Provinces of Bengal during the year 1868-69.

INTRODUCTION.

The operations and transactions of the Forest Department in Bengal during the year under review have been confined almost entirely to the Sikhim and Bhootan Divisions.

2. This report, therefore, refers chiefly to the forests of these divisions. In Section I., however, I have embodied as much information as I have been able to collect from the office records, regarding the forests in Bengal generally.

3. In order to illustrate the subject, a map of the Lower Provinces is submitted with this report, indicating the general position and extent of the forest tracts alluded to, and distinguishing, as far as possible, the Government forests from those belonging to private individuals, also showing the proposed forest divisions of Bengal.

4. The forests of the Eastern Bhootan Dooars were inspected by the Assistant Conservator of Forests, Mr. Mann, early in the dry season, and a report regarding them was submitted to Government in February last. This completed the general examination of the forests in the Bhootan Dooars, the western portion having been reported on in May 1868.

5. The forests in Assam, to the north of the Brahmapootra from its tributary, the Monass River, up to Debrooghur, were also inspected by the same officer.

Mr. Mann has furnished several interesting reports on the subject, which are appended.

6. The present report is divided into the following Sections, in accordance with the arrangement of headings prescribed in Public Works Department Standing Order No. 2 (Forests), dated 9th October 1866 :—

Section I.—Inspection of Forests.

II.—Reserves.

III.—Plantations.

IV.—Yield of the Forests.

V.—Financial.

VI.—General Remarks.

7. The financial results of the operations of the Forest Department during the year 1868-69 are shown in the accompanying eight Statements, which are those prescribed by the Government of India in Circular No. 8, dated 10th August 1866 :—

1. Summary of revenue and expenditure.
2. Abstract cash account.
3. Statement of outstandings.
4. Statement of timber brought to depôts.
5. Annual timber account.
6. Statement of amount realized by sale of timber.
7. Statement of expenditure on account of timber.
8. Annual account of forest revenue.

BENGAL SECRETARIAT LIBRARY

SECTION I.

INSPECTION OF FORESTS.

8. It may be useful and not out of place here to collect from previous reports the principal data regarding the Government forests in the Sikhim and Bhootan Divisions on which to base a plan of future operations.

9. Owing to the incomplete nature of the data at present available, any plan now proposed must necessarily be very deficient in many points of detail, still it may form a general guide in conducting future operations for the gradual removal of the mature timber, and for the re-production and improvement of these forests by sowing or planting.

10. The Government forests in the temperate parts of British Sikhim cover an area of about 17½ square miles in four blocks, 2, 4, 5½ and 6 square miles each.

11. Of these blocks the last three only are accessible or can be made so. The first is so isolated, that it may, for the present, be left out of account in framing a working plan.

12. There are, therefore, only 15½ square miles of temperate forests available for working. This area contains, according to last year's estimate,—

2,000 First Class magnolia trees,

17,600 First Class oak and chestnut, and

17,200 First Class trees of inferior but useful kinds.

To these must be added the second and third class trees, in order to represent the growing material available for use during the next hundred years. The total number of second and third class trees added together probably equals, but does not exceed that of the first class trees. The above figures may therefore be doubled. The proportion of fourth class trees or saplings of oak chestnut and magnolia in the temperate forests of British Sikhim is at present estimated at not more than ten per cent. of the number of trees of the other classes in the forest. This paucity of seedlings is no doubt greatly due to the mature state and dense shade of the greater part of these forests, but it also shows that it would not be advisable to depend upon natural re-production alone for their permanent maintenance.

13. Assuming then that plantations will be mainly relied on, and that 100 years hence the young plantation of timber producing trees already formed will have arrived at maturity, and that every year 100 acres more will be successfully planted, it will follow that, at the end of 100 years, 10,000 acres, or about 15½ square miles, will be covered with 100 plantations of equal size, but differing in age by one year in arithmetical progression, from 1 up to 100 years.

Rotation.

14. It equally follows that the present growing stock of timber may with safety be gradually removed within the first forest rotation or revolution of 100 years to give place to these plantations.

Annual yield.

15. A rotation of 100 years will, according to the present estimate of stock in hand, allow of the annual removal from the entire forest of 40 magnolia, 352 oak and chestnut, and 344 trees of other useful kinds, besides common woods which constitute more than half of the whole growing material; but it may be necessary to exceed these figures in the first decades of the rotation, in order to utilize the superannuated trees before they become valueless from decay.

Method proposed for the gradual removal of the mature timber.

16. A description of the method to be adopted for the gradual removal of the mature timber must form an essential part of any plan proposed for working these forests.

The necessity in mountain lands for preserving the forests on the ridges and the upper part of the slopes is generally recognized, and it would be contrary to nature to deprive young plants of all shelter by making a complete clearance.

17. The only mode of procedure which is not open to the above objections appears to be that of selecting, in the first instance, and removing the superannuated trees here and there throughout the forest, provided they will yield marketable timber, otherwise it would be better to spare them for re-productive purposes. Then, in order to furnish space sufficient for planting, it will be necessary partially to clear a hundred acres of forest contiguous to the previous plantation, by removing all the mature timber and the trees of inferior kinds.

The younger and middle-aged trees of the more valuable species will be left standing to shelter the young plants: care being also taken that a large number of trees may be left on the ridges and upper slopes. The total number of trees to be felled annually will be limited by the normal yield as previously determined.

Proposed order of working during the next hundred years.

18. The following will be the general order of operations in the three blocks at present available for working in the first rotation of 100 years, beginning with the year 1868:—

Area.	Period of working.	Operations.
Block I., 5½ square miles	1,868 to 1,906	Plantations of magnolia, walnut, oak and chestnut of 100 acres annually.
,, II., 6 ,, ,, ...	1,904 to 1,942	
,, III., 4 ,, ,, ...	1,943 to 1,968	

19. The present estimate, regarding the growing stock of timber in these forests, is subject to alteration, as further valuation surveys will give results more approximately correct; but the more complete data thus obtained will not necessarily involve any radical change in the general plan here proposed.

The temperate forests on the Bhootan side of the Teesta.

20. The temperate forests on the Bhootan side of the Teesta Valley are supposed to be more extensive than those on the Sikhim side, and to contain large stocks of timber, but they have not yet been explored.

The sâl forests on the outer hills and in the Sikhim Terai.

21. The sâl forests on the outer hills of British Sikhim cover an area of about 12 square miles, and are estimated to contain a sufficient quantity of mature sâl timber for conversion into 40 to 50 thousand sleepers; also 1,000 chalawnee trees. But only a very limited portion of this timber is situated in places whence it can be removed in the form of logs. The Sikhim Terai forests cover about 19 square miles, and are said to contain no mature sâl, and only 800 chalawnee trees fit for the axe. They are, however, very rich in young trees, and will become very valuable 30 or 40 years hence.

If the above estimates are correct, the annual supply of sleepers drawn from these forests should certainly not exceed 2,500.

The forests of the Rajah of Sikhim.

22. The sâl forests in the Teesta and Great Rungeet Valleys, situated on British territory, are estimated to occupy an area of 23 square miles, and to contain 12,000 sâl and 5,000 chalawnee trees fit for felling. The forests belonging to the Rajah of Sikhim are probably of greater extent and equally rich in sâl. They also contain abundant supplies of pine timber (pinus longifolia), a considerable quantity of which was purchased from him by the Department during the year before last.

It is said that the sâl trees can be had on payment of a royalty of Rupees 2 each. It may be possible to lease these forests from the Rajah, in perpetuity or for a term of years, and, at the above rate, it would certainly be advantageous.

It is evident that, to the Teesta forests, we must look for supplies of sâl timber for the next 40 years, or until the other forests have recovered from the exhausting effects of former working.

Annual yield.

23. Assuming that the present stock of sâl trees, 6 feet in girth and upwards, standing in the Government forests of the Teesta and Rungeet Valleys, will be completely replaced in 25 years by the natural growth and expansion of an equal number of sâl trees at present under 6 feet in girth, then we are justified in concluding that one twenty-fifth of the existing mature timber may be felled and removed every year. This will give an annual yield of 500 trees or tons.

24. It is hoped that further explanation and valuation of the sâl forests in the valleys branching off from the Teesta on the Bhootan side will considerably augment the estimated annual yield.

Sâl and sissoo forests in the Bhootan Division.

25. The sâl forests in the plains of the Western Dooars are estimated to extend over an area of about 40 square miles, arranged naturally in 13 blocks, averaging from 1½ to 8 square miles each, but it is estimated that in only four of these are there any first class sâl trees. The four blocks alluded to are each, respectively, 8, 3, 4, and 6 square miles in extent, and are estimated to contain each respectively, 2,000, 5,000, 1,000 and 1,000 first class sâl trees. The sâl forests on the hills are reported to cover 60 square miles, and to contain 5,000 first class sâl trees, besides abundance of chalwanee, urjun and cutch.

26. Assuming that 25 years will elapse before any of the other forests can yield first-class sâl timber, the material available for use during that period in the Western Dooars is represented by 14,000 first class sâl trees, or an annual yield of 560 logs, exclusive of dead and wind-fallen trees and waif timber.

27. But as the value of these forests has not yet been closely estimated, it is impossible at present to say, with any degree of precision, what quantity of timber may be brought out annually without diminishing future supplies.

28. Valuation surveys will be made in the forests of the Sikhim and Bhootan Divisions, and further data, on which to estimate the growing timber stock, will thus be collected.

29. The sissoo forests in the Sikhim and Bhootan Terai cover an aggregate area of 15 square miles in five blocks, of which the largest and the only one containing any quantity of large timber is that on the banks of the Torsa, six square miles in extent, and estimated to contain 2,300 sissoo trees above 5 feet in girth.

The sâl forests of the Eastern Dooars.

30. In the Eastern Dooars the sâl forests are estimated to extend over about 364 square miles, but only 200 square miles are covered with forests, in which sâl is the characteristic and principal tree. The rest contains sâl in various proportions, and should be placed under the control of the Forest Department, as far as regards that timber and trees of other reserved kind.

31. The area of pure or compact sâl forest is divided naturally into four extensive blocks—

Block	I.	Dooar Gooma Forest	15,779 acres,	or 25 square miles.		
,,	II.	,, Reepoo	,, 34,403	,, or 54	,,	
,,	III.	,, Cheerung	,, 37,220	,, or 58	,,	
,,	IV.	,, Sidlee	,, 40,274	,, or 63	,,	
		Total	... 1,27,676 acres, or 200 square miles in round numbers.			

32. These tracts have been demarcated in a preliminary manner by the Revenue Survey Department, with a view to their reservation as State Forest Domains.

33. They are reported to contain no sâl trees fit for felling but abundance of young sâl. In that case the duties of the Forest Department in the Eastern Dooars will, for the next 25 years, be principally confined to protecting and improving these reserves, leaving to nature the work of maturing the timber which they contain.

34. As a first measure of conservancy, a moonshee and two forest watchers have been stationed in the Eastern Dooar Forest for protective purposes.

35. In the Eastern Dooars the principal water-ways, besides the Sunkoss, are the following :—

1. The Longa and Hail.
2. The Saralchanga and Gourang.
3. The Champamootee.
4. The Gaboor Aie and Boree Aie, and
5. The Monass River.

36. Sâl and sissoo reproduce themselves abundantly, so that, under ordinary management, the Government forests in the Sikhim and Bhootan Terai will improve rapidly and become consolidated and compact.

The sâl forests in Assam.

37. Regarding the sâl forests of Assam, Mr. Mann reports as follows :—

"Sâl forests containing mature trees exist only in the Kamroop District, south of the Brahmapootra, and in the Nowgong and Seebsaugor Districts. All the sâl forests, north of the Brahmapootra, in the Kamroop and Durrung Districts, do not extend over more than 6 square miles and contain no mature timber.

"Taking into consideration that all the forests in the Eastern Dooars have been completely worked out; that in the Western Dooars the supply to be had is very limited; that in the Darjeeling District mature sâl is left only on the hills; that this timber is becoming scarce in other Presidencies and in Foreign states, such as Nepal, the strictest conservancy of the sâl forests of Assam becomes imperative."

38. The sâl forests on the south side of the Brahmapootra have not yet been inspected; but sufficient information regarding them has been obtained to know that they are very extensive and valuable, although only one-tenth of the whole is said to contain mature timber.

The Indian rubber forests of the Durrung District.

39. The Indian rubber or caoutchouc forests of the Durrung District, in Assam, extend over an area of about 585 square miles, and are distributed as follows :—

Kaling Dooar ..	40 square miles.	
Boree Gooma Dooar ...		
Borceparra Dooar ...		
Chardooar Forest ...	220	„ „
Nowdooar Ditto ...	200	„ „
Chydooar Ditto ...	125	„ „

40. Besides the caoutchouc tree these forests contain many serviceable timber trees, which enter into the composition of the forest in the proportion of about 20 per cent. at the foot of the hills, and about 10 per cent. in places beyond 6 miles from the hills.

Contemplated plan of working the caoutchouc forests, and proposed measures for their improvement.

41. It is proposed to divide the caoutchouc forests of the Durrung District into three blocks, and work them in rotation under permit agreements.

The order of working will, if approved of, be as foll

	Year of working.	Year of working.	Operations.
The Chardooar ...	1870	1873	Plantations of Indian rubber trees to be formed in each block successively in the order in which the caoutchouc workings are conducted.
The Nowdooar ...	1871	1874	
The Chydooar ...	1872	1875	

42. The three small forests first mentioned are in a very exhausted state from the effects of overtapping and recklessly felling the caoutchouc trees. It seems therefore advisable not to include them in any plan of working until they have had some years of complete rest.

The other forests are also greatly impoverished but not to the same extent.

43. It is proposed that plantation operations should be carried on by the Department in each block successively to improve these forests, and at the same time keep a check on the proceedings of the permit holder.

44. These tracts are said to be well adapted for plantations of teak and toon as well as of caoutchouc trees. A bag of teak seed has been sent to Mr. Mann, to try the experiment of raising teak in Assam.

45. In the Chydooar block there are considerable patches of forest in which the Soom tree (Tetranthera Lancifolia) predominates. The leaves of this tree are used in rearing silk-worms.

Soom forests of Luckimpore District.

46. On leaving the Durrung District and entering Luckimpore more extensive Soom forests are met with. Of these Mr. Mann reports :—

"The Soom forests are always pure, and they are so extensive that they would suffice for the rearing of silk-worms if this branch of industry should increase ten-fold."

47. The Soom forests occupy about 450 square miles of the forest land of Luckimpore lying to the north of the Brahmapootra River. About 940 square miles of this country are under forest, interrupted only here and there by sparsely cultivated lands.

List of useful kinds of trees found in Upper Assam.

48. The following descriptive list of useful kinds of timber found in the forests of Upper Assam has been kindly furnished by the Executive Engineer of the Upper Assam Division. Those in common use are marked with an asterisk.

A List of Timber Trees found in Upper Assam.

*1. *Nahor*, "*Mesua Ferrea*".—A dark close grained very hard heavy wood, used for house posts and building purposes; exceedingly strong and durable.

2. *Jululee*, "*Liquidamber species*".—A noble tree, trunk very lofty and straight; the wood is hard and compact but liable to the attacks of insects.

*3. *Azhar*, "*Lagerstrœmia Reginæ*".—Grows on low land; the wood is light and strong, and one of the most lasting woods in Assam, both in the open air and under water. It is supposed to be the same as Jarool used in Bengal for boat building, but is there considered an inferior wood, and described as soft and deficient in toughness.

*4. *Poma, " Cedrela Toona."*—Often 6 feet in girth; a close hard but rather brittle wood of dull red color used by the Natives for canoes and esteemed for furniture; it has an agreeable smell; is a first rate wood for doors and planking; is easy to work and does not warp.

5. *Latekee, " Picrardia Supida."*—A small tree; the wood is heavy, tough and durable; used for house posts.

6. *Sam, " Artocarpus Chaplasha."*—Attains a great size; used for canoes, for which it is well fitted, being both buoyant and durable in water.

*7. *Kuthal, " Artocarpus Integrifolia."*—The wood is strong and durable; used for house posts and coarse furniture.

*8. *Uriam, " Audrachone Trifoliata."*—Found near the banks of rivers and on low land; it is strong and hard but a brittle wood of a dark red color, useful for building and coarse furniture. It is very durable in water.

9. *Parolee, " Bignonia Chelonoides."*—Grows in low swampy ground; the wood is tough and light; used by the Natives for making their sugar presses.

10. *Hilikha, " Serminalia."*—A hard and durable yellow wood useful for turnery; it is used by the Natives for cups and bowls. Blacking or ink can be obtained from the seeds.

11. *Boroon, " Terminalia."*—Useful compact wood.

*12. *Bola, " Terminalia."*—Is a very strong and elastic wood; used by the Natives for boithas or oars and for scabbards of swords and dahs. It is very durable and lasts well as house posts.

13. *Hingoree, " Castanea."*—A chestnut or oak; cup covered with strong prickles, leaves notched. A strong heavy, straight grained serviceable timber.

*14. *Gunsoroie, " Lamus Sassafras."*—The wood has a strong smell of camphor, is light and tough; used for canoes.

15. *Boga Poma, " Chickrassia Tabularies."*—A small tree. The wood is soft and white but tough; used for plough shafts and handles for dahs and knives, and sometimes for canoes.

16. *Gomaree, " Gurelina Arborea."*—Often 5 feet in girth. A light durable wood, well adapted for turnery, used by the Natives for drums and other musical instruments.

17. *Titasopa, " Michelia Species."*—A fine tree often 8 feet in girth. The wood is light and soft, easily worked, with a beautiful straight grain; much esteemed for various purposes.

18. *Phoolsopa, " Michelia."*—The wood resembles titasopa, but is considered less durable.

19. *Roghoo " Nauclea Cadamba."*—Very light soft wood, much used for tea boxes, for which it is well suited, the timber being easily worked and perfectly scentless.

20. *Soteanah,* A leguminous tree; wood similar to Roghoo.

21. *Mahundee,* A small timber tree used only for firewood.

22. *Helos, " Stilags Bunias."*—A soft wood of little value; seeds eaten by Natives.

23. *Gohonah,* A small tree, seldom exceeding 3 feet in girth; the wood is of a yellowish color, compact and very durable; much used for house posts; not attacked by white ants.

24. *Moj, " Inga bigemina ? Moya" ?*—The heart of the wood is dark colored and very hard, used in building; liable to attack of insects.

25. *Morehall,* A very handsome close and even grained wood, but soon destroyed by insects.

*26. *Jamoo, " Syrygium Jambolanum."*—Grows to a good size; the wood is strong and hard, not attacked by insects; used in building and coarse furniture.

27. *Bellook,* A light straight-grained useful wood.

28. *Amlokhee, " Emblica Officinalis."*—A small tree, wood dark red; the fruit is eaten by the Natives.

29. *Otengah,* A coarse wood used only for house posts.

30. *Korei, " Acacia Odoratissima."*—A very large tree; wood tough and strong, but light; used for canoes.

31. *Koneeneemoola,* About 4 feet in girth; wood tough; used for oars or boithas; fruit is sweet, eaten by the Natives.

32. *Booal, " Ehretia serrata."*—A large tree, often 7 feet in girth; wood soft and open-grained but tough; used for oars or boithas and for plough yokes.

33. *Lemtem, " Chaulmoogra Odorata."*—A small timber tree; wood hard but brittle, not considered durable.

34. *Koojee Thekera, " Garcinia Pedunculata."*—About 3 feet in girth; wood hard and close-grained, but warps and splits easily.

35. *Juggroo,* A light open-grained wood used in building; probably a ficus.

36. *Hickooteah,* About 3 feet in girth; wood hard and close-grained. This tree is not common.

*37. *Beh, " Salix tetrasperma."*—Attains a large size; wood dark red, tough and light, and is admirably adapted for well curbs.

38. *Bun am, " Mangifera Sylvatica."*—The wild mangoe wood, firm and useful; fruit ripe in November.

39. *Ghon am, " Mangifera Indica."*—The common mangoe wood, inferior.

40. *Oodal " Sterculia arcus."*—A large tree; wood of no value; the bark is very strong and is twisted into ropes for catching wild elephants, and used for making nets for snaring deer.

41. *Selang,* A very large tree, wood soft and light; used for canoes.

42. *Thekerah,* A small timber tree; wood very brittle; used only for posts.

43. *Naga Tenga.*

44. *Tepon " Zanthochymus Pictorius."*—A small tree; wood strong, heavy, straight-grained; fruit eaten; bark used in dying cloth yellow.

45. *Borthekera, " Garcinia Pedunculata."*—A large tree; the wood is hard but not much esteemed.

46. *Moormooree,* Close grained firewood; used in building.

47. *Mypak,* Grows to a good size; wood light and close-grained, used for making spinning frames.

48. *Bellook.*

49. *Boomruttee,* A small tree; found in swampy land; a straight-grained, easily worked wood.

50. *Bhatgheela,* A soft open-grained useful wood. The blossom is boiled and eaten by the Natives.

51. *Neghneehia,* About 3½ feet in girth; wood straight and open-grained; used for beams.

52. *Poneeal,* A small tree; branches very thorny; wood hard and close-grained; used for common purposes.

53. *Moheeta,* A fine large tree, 6 feet in girth; trunk lofty; used for canoes; wood open, soft, rather tough.

54. *Neerhee,* A small tree; wood soft and brittle.

55. *Soh,* About 4 feet in girth; wood very light and open-grained but tough; used for canoes.

*56. *Sissoo, "Dalbergia Scandens."*—A very hard, strong wood of great repute for furniture.

49. Mr. Mann remarks with reference to the excellent water communication in Upper Assam,

"Few countries offer greater facilities for the removal of timber." And with regard to the means available for the cultivation of timber trees, he says, "Extensive plantation of timber trees may be formed, without any expense, if the "Meerees," a wandering agricultural race, can be induced to plant timber trees amongst their crops in consideration of exemption from capitation tax."

50. In Burmah the experiment of forming plantations by the agency of semi-nomadic tribes of Shans and Karens has been tried with some degree of success.

If this kind of agency could be extensively employed for the same purpose in the forest tracts of Bengal, it would afford some prospect of the future restoration of those once valuable forest lands which have been converted into unproductive wastes by the lamentable effects of joom cultivation. Owing, however, to the timid and suspicious nature of all these wild tribes, it is to be feared that their assistance in the work of forest restoration cannot be relied on in any great degree.

51. There are other forests of wide extent in Upper Assam which have not yet been reported on. Those on the Dehing and Desang Rivers large affluents of the Brahmapootra are believed to be rich in timber trees.

Nambur forest.

52. The Nambur forest on the Naga Hills, the charge of which was handed over to this Department in January last, contain valuable supplies of timber.

Protective measures adopted.

A small protective establishment of one moonshee and two watchers has been engaged to guard this forest tract until it can be set apart as a State Forest Domain.

53. Two forest watchers have also been placed in the Kamroop District to bring any cases of unlawful felling or removal of timber to the notice of the Civil Authorities until the orders of Government have been passed regarding the forests. Other two men have been stationed in the Durrung District for a similar purpose.

The forests of Cachar and Sylhet.

54. Little is yet known regarding the timber forests in the Dacca Division, but the Deputy Commissioner of Cachar gives the following account of some of them :—

"The higher hills throughout the districts are covered with forests. There are dense forests also in the valley of the Jeri, and in the south part of the Hailakandy, Chatla, Howhur, and Sonai plains. The entire extent of forest land on hill and plain is estimated at about 4,000 square miles. In addition to this there lies to the south an extensive forest tract extending to Chittagong, and supposed to be attached to the Cachar District."

55. With reference to the last mentioned tract, the Commissioner of the Dacca Division writes on the 2nd of April 1869 :—

" I have just returned from an expedition against the Looshais and traversed some 60 miles of country south of Cachar quite uninhabited and bearing magnificent timber of various kinds. By the late rulings of Government the country between Cachar and Chittagong is declared to be British."

56. In a letter to the Government of Bengal the same officer writes :—" In Sylhet there are thousands of acres of forest ; in some of these Government has a clear right. Some Natives have nominal rights, not such as in permanently-settled states, but somewhat similar, Government might easily assume the management of these forests. They are for the most part uninhabited and almost impenetrable.

" In Cachar leases of much land have been given to tea planters, and hills are denuded of timber for tea gardens, but by far the greater area is either unleased or under forest, and I am told this forest contains abundance of good timber : nothing has ever been done to preserve it, and all accessible good trees are ruthlessly felled whenever they can be floated to a market, or whenever an owner of an elephant can manage to get them dragged to a stream."

Products of the Cachar forests.

57. Nagissur, jarool and toon are said to be the principal timber products of Cachar. " Nagissur" is the same as the " Nahor" of Assam. Regarding this timber the Deputy Commissioner of Cachar says : " It is one of the hardest and most durable of woods, unequalled for building purposes, and beams made of it last for years and defy damp and white ants." Jarool is probably identical with the red Pyimma of Burmah, and like it is much prized for boat building. The minor produce of the Cachar forests consist chiefly of India rubber, canes, bamboos and ivory.

Rates of duty levied at the Sealtekh Ghaut toll house.

On most of these products a transit duty is levied at the Sealtekh Ghaut according to the following schedule of rates. The right to levy these tolls is leased, and realized last year the sum of Rupees 11,035. Rates of duty on exports at the Sealtekh Custom Ghaut:—

	Rs.	As.	P.	
Jarool timber under 12 cubits	1	0	0	each.
" above 12 and not exceeding 20 cubits ...	2	0	0	"
" " 20 cubits	4	0	0	"
House posts, planks, rafters 20 cubits	0	1	0	"
Other timber under 12 cubits	0	8	0	"
" not exceeding 16 cubits	1	0	0	"
" " 20 cubits	2	0	0	"
" " 24 cubits	3	0	0	"
Exceeding 24 cubits—for every additional 4 cubits ...	1	0	0	"
Planks, &c., &c.	0	0	6	"
Bamboos per thousand	1	0	0	"
Canes.				
Jally and Soondic rattan bate 100 bundles	1	8	0	"
Gulla bate	2	0	0	"

The forests of Chittagong.

Forest products of Chittagong.

58. In the Chittagong Division the workable forests are estimated to cover 1,500 square miles. They are situated on the Hill Tracts and appear to produce the same kinds of timber trees as are found in Cachar, with the addition of " Jamboo" or the ironwood tree (Ingaxylocarpa) and the magnificent " Gurjun" or wood oil trees (Dipterocarpus Alata.)

Neither teak, sâl nor sissoo are said to be found either in the Cachar or in the Chittagong forests.

59. In Mr. Leeds' report on the Chittagong forests, dated 26th February 1868, it is mentioned that "the revenue on forest produce, consisting of timber, bamboos, thatching grass, and canes is levied at certain toll houses on the rivers where the produce is stopped for examination and payment of seigniorage or toll. This consists of a five per cent. *ad valorem* duty upon the market value of the produce at Chittagong. The right to levy these tolls on the Kurnafoolee River has been granted for a term of five years to the Kalindee Ranee, who pays Rupees 5,000 per annum for this privilege. The tolls on the Fenny and Sungoo have been similarly granted to the Bhomong and Mûn Rajahs, on payment to Government of half the net collections. The forest revenue derived from these sources last year amounted to Rupees 10,816.

Forest revenue how collected.

60. Some of the forests situated in Districts of Bengal, not yet formed into forest divisions, are said to be very extensive and valuable. The unassigned woodlands in the Soonderbuns, for instance, which cover upwards of 3,000 square miles, is the main source whence the dense population of Calcutta, Hooghly, Jessore, Backergunge, Naraingunge, and Dacca derive their supply of fuel and wood for domestic and agricultural purposes This fact alone is sufficient to indicate the value of the Soonderbun forests. There can be no doubt that, in the hands of Government, under an efficient management and worked on the permit system, with watchmen stationed at every outlet, these woodlands should yield a permanent revenue of several lakhs to the State, and an unfailing supply of wood at a fair price to the public. The monopoly of the Bunkur or forest produce of these lands being at present in the hands of the Port Canning Company, no measures of forest conservancy can, it is supposed, be introduced until their current leases shall expire in 1871.

The Soonderbun forests.

The following is a list of the principal kinds of wood to be found in the Soonderbuns, and their uses furnished in a letter from the Commissioner of the Soonderbuns to the Commissioner of the Nuddea Division.

Produce of the Soonderbuns.

Native names of trees.	Average diameter in feet.	Remarks.
Gaub	3 feet	The sap extracted from it is extensively applied to native boats, as a preventive against decay.
Hurtukky	3 ,, ...	The gallnut tree. The timber is used for a variety of purposes.
Soondree	2 ,, ...	A strong wood, and used for a variety of purposes.
Posoor	2 ,, ...	Used for the manufacture of native furniture.
Kaorah	3½ ,, ...	Used for platforms, boxes, &c.
Kirpa	2 ,, ...	Used in making small dinghees, &c.
Byre	3 ,, ...	Used for sluices, &c.
Korœ	2 ,, ...	Used for posts, &c.
Aumsir	1 foot	
Gurran	8 inches ...	Used for posts; bark used for tanning.
Sonalee	2 feet	
Bhylah	1 foot	Used for posts and hookah pipes.
Jeen	4 feet	Used for fire-wood.
Loha koira ...	1½ foot	
Poolsee	1 ,, ...	
Singra	1 ,, ...	
Chorlah	2½ feet	
Khankrah	2 ,, ...	
Naimgah	2 ,, ...	Used for making handles for bill hooks and spades.
Boloe	6 inches	Used for fire-wood. The inner bark has a strong fibre.
Oorceam	2 feet	Used in making dinghees, platforms, &c.
Gaoah	2 ,, ...	Used for native drums, picture frames, &c.

Forests of the Burdwan Division.

61. Regarding the gradual clearance of the sâl forests in the Burdwan Division, described in Mr. Seton-Karr's letter to the Government of Bengal, No. 1 of April 1867, reference was made by Mr. Leeds to the Commissioner of that Division, asking for information on the following points :—

1st.—Whether the holders of the forest tracts could be induced, it being otherwise feasible, to exchange them for other waste lands more valuable, and fit for agricultural purposes ?

2nd.—Could the tracts, or certain portions of them, be leased by Government under certain conditions which would ensure conservancy and a refund to Government, hereafter, of all expenses incurred ?

3rd.—Could certain portions of the tracts be purchased outright, their present value being appraised by arbitrators to be appointed by all parties concerned ?

4th.—Could the present owners be induced to stop the cutting of fire-wood in certain tracts, and to adopt a system of conservancy in them ?

Midnapore jungle.

62. Replies to these questions have been received from the District Officers. From these letters, and the maps which accompanied them, I gather that the only sâl timber forests of any extent and importance in that Division are situated within what are termed the jungle mehals of the Midnapore Zillah, which are settled in perpetuity. The Officiating Collector of Midnapore says :—" The rental of these estates is extremely low in comparison with the area, owing no doubt to the large extent of uncultivated land at the time of the settlement. For example, the zemindar of Jhargaon, an estate which contains no less than 109,985 acres, pays a revenue to Government of only Rupees 258-1-10. The total area of the jungle mehals is 1,175½ square miles." Nearly all the other jungle tracts in the Burdwan Division consist either of low brushwood or coppice woods, which have succeeded the forests of sâl timber. In most zemindaree estates, especially in the Bancoorah District, this brushwood is cut down periodically for fire-wood and for the manufacture of charcoal, for which there is a large and permanent demand.

Coppice woods in the Burdwan Division.

The *Rakha jungles* or coppice woods are cut down at longer intervals, and the crop of wood is sold and used for posts and rafters in building native huts, thus yielding a permanent revenue to the landowner. A zemindar, in the Burdwan District, in reply to the queries put to him on this subject says—

Opinions of the Zemindars.

" I preserved for a long period many trees in this jungle, in order to see if they could be made fit for building purposes, but failing in the attempt, I see that this jungle gives trees only fit for fire-wood and for no other purpose. I think that to sell and use the trees of this jungle for fire-wood, is more lucrative for me than to use it in any other way. Therefore I am not willing either to exchange it for other waste land more valuable nor to lease it out to Government under certain conditions, nor to sell it at once, nor to stop the cutting of fire-wood." Athough the overtures made were more favorably received by some of the zemindars, still I believe the above reply expresses the opinion and feeling of the generality of land proprietors in the Burdwan Division.

Coppice wood more profitable to the owners than high timber forest in the Burdwan Division.

63. There can be no doubt that in such localities a forest properly managed under the coppice wood system will give a quicker and larger return to the owner than it would if treated as a timber producing forest. It is evident then that if private individuals follow the dictates of self-interest, by which people are generally influenced, they will not, as a rule, invest their capital in the production and re-production of timber trees, nor will they preserve the timber forest which they may happen to possess, when, by cutting it down and treating the new

growth as coppice woods, they can obtain a much larger return, present and prospective. Private enterprise cannot, therefore, be safely relied on in the matter of timber production, and the natural law of demand and supply here generally fails. It is the State only which possesses interests sufficiently wide and permanent and commands resources sufficiently ample to enable it to undertake the rearing of timber producing forests at a large immediate outlay, and receiving only a moderate and frequently very tardy return.

64. Under these circumstances the only course open to Government to adopt, with the view of restoring some of the sâl forests in the Burdwan Division, appears to be to take up suitable patches of land under Act VI. of 1857, for the purpose of planting or sowing. A proposition to that effect will therefore be submitted after careful inspection of the localities in question.

65. As no timber forest is safe in the hands of private individuals left to their own discretion, I would venture here to suggest that in all deeds of sales, by which the proprietary right of Government in land containing forest is conveyed to private individuals, a clause should be inserted, reserving the right of Government in the timber and forest produce, or at least stipulating that the proprietary right is conferred, subject to any rules that may be made in the Forest Department.

Forests in the Cuttack Division.

66. With reference to the forests in the Cuttack Division, the Officiating Superintendent, Tributary Mehals, Cuttack, says in a letter to the Government of Bengal, dated 29th April 1868, "there are no public forests or plantations in the district of this Division. In the Political Department, and under my supervision as Superintendent of Tributary Mehals, are three Government estates, Bankey, Ungool, and the Khund Mehals."

Bankey.

"In the former there is little or no timber; some small hills and rocky tracts being covered with scrub jungle only. I believe timber might be planted and grown there, the land being waste and useless for any other purpose."

Ungool.

"In Ungool there are considerable tracts of sâl forests, the timber on which has been preserved; and the right of felling it, when above one foot in diameter, has been leased. This forest lies on the north bank of the Mahanuddee, and is susceptible of conservation and improvement."

Khund Mehals.

"In the Khund Mehals also considerable tracts of jungle, and some good sized timber, scattered here and there, is to be found; the country is so remote and hilly that the possibility of carrying even moderately sized timber to the river is doubtful. There appears no objection whatever to placing the complete management of these forests and jungles under the Forest Department."

67. The forests on the Mahanuddee River will probably become very valuable hereafter, as constituting the chief source for the supply of sleepers in the construction and maintenance of the northern section of the proposed East Coast of India Railway, and of any branch line which may be made to open up the Mahanuddee valley.

68. The Commissioner of the Chota Nagpore Division gives the following information, in a letter to Government, regarding the forests in his Division :—

Chota Nagpore forests.

"In the settlement now being made of the Government villages in Pergunnah Palamow large tracts of waste and forest land are surveyed as separate blocks and reserved. There are not many of them containing valuable timber, owing to the devastation of forests by the peculiar mode of cotton cultivation practised in Palamow, but in regard to such forests as remain the rules could be easily enforced by the Officer in charge of the Sub-division."

Palamow.

Hazareebaugh.

"In the Hazareebaugh Division there are no forests belonging to Government worth preservation, but no doubt if the waste lands in *Kodurmah* were left to themselves for some years, the sâl forests would again spring up."

"In the *Colehan* we have forests which the Government have a right in; the *Mankees* of the *Kol Peers,* who have also an interest in them, have promised to do their best to see the rules carried out."

"There are no other forests in Chota Nagpore with which the Government have any right to interfere."

"In regard to forests on the zemindary estates, the Forest Department can do very little, and the forests in Government estates may, I think, be very well left to the management of the local authorities; but I shall be glad if, in our care of them, we can be directed by the head of the Forest Conservancy Department."

69. The following forest rules have been promulgated in the Chota Nagpore Division by the Commissioner, and are reported to have been generally observed.

Chota Nagpore Forest rules.

"Whereas great destruction of valuable timber is annually caused in this Division by the practice resorted to of girdling the trees with deep incisions cut into the stems for the purpose of obtaining the gum or resinous substances, therefrom exuded, notice is hereby given, under orders of Government, that in all estates, the property of Government, or held in trust by Government, the incising of timber for the purpose of extracting the gum or resin is hereby prohibited, except by persons who obtain from the Deputy Commissioner of the district a permit to collect such gum, under certain conditions to be engrossed on paper bearing a stamp of Rupees 5."

"The licenses thus obtained will give the holders authority to collect the gum or resin within certain specified limits, in such a manner as will cause least injury to the tree, that is, by incisions of a length, breadth and depth, and in positions to be prescribed by the Deputy Commissioner."

"Notice is further hereby given, under the orders of Government, that in all estates, the property of Government, or held in trust by Government, the destruction of timber trees for temporary cultivation is strictly prohibited, and all persons infringing this order will be liable to prosecution of criminal trespass, and have to make good the full value of the trees destroyed."

"Persons desirous of making clearances for purposes of permanent cultivation, or of cutting and removing timber for use, must apply to the Deputy Commissioner or Officer in charge, or if the estate is farmed to the lessee; and leaseholders will be precluded from giving their sanction to the felling or destruction of timber in contravention of these rules."

Forests on the Sone and Koel.

70. In a printed copy of some interesting reports by the Officers of the late East India Irrigation Company, on the forests and coal fields of the Upper Sone and Koel Rivers, I find the results of an examination of these forests thus summarized by the Executive Engineer, Dehree Division.

1*st.*—"On the Sone itself no good sâl timber remains within available distance of the river, but "Kooroom," "Anjun," and "Bejaya" wood can be had on both banks from 83°25' to 83°55' east longitude, also fire-wood at a rate which would enable us to lay it down at Dehree, at Rupees 8 per 100 maunds."

2*nd.*—"On the Koel there is some "Anjun wood on the east bank about 24°20' latitude, on the west bank latitude 23°50' is a jungle with "Kooroom," "Asun," "Korasun," "Dhow"

and bamboo. On the east bank latitude 23°45′, and round towards Palamow is a jungle, extent not known, with very fine sâl trees. The navigation is obstructed at Siksiggie, which some means must be found to remove."

3rd.—"In the northern part of the Kymore hills, about 12 miles south-west of Bhubhova, is a jungle with fine sâl trees."

71. The forests on the Kymore range are in the Shahabad District, of the Patna Division, and appear from the correspondence quoted to belong to independant zemindars; but some of the forests in the Palamow Pergunnah are Government property.

Forests in the Patna Division.

72. In the Patna Division there is a strip of forest land extending along the whole of the southside of the Division, and also a narrow belt at the foot of the hills, in the north-west corner adjoining the Nepalese territory, but most of these forests are, it is believed, in the hands of private individuals, and their area and timber contents are not known.

Advantages of Shergotty as a timber producing locality.

The Collector of Shergotty sub-division some time ago pointed out the facilities that appeared to exist for turning Shergotty into a timber growing sub-division for the supply of Government timber, from the fact that wherever sâl and teak trees had been planted in Shergotty, they had flourished beyond all expectation, and from the existence of abundance of waste land, the property of zemindars, with excellent water carriage close by.

The whole of the proprietors, however, on being communicated with, expressed themselves most unwilling to sell or lease the land in perpetuity.

Forests of the Bhaugulpore Division.

73. In the Bhaugulpore Division the only public forests are those of the Damin-i-koh, in the Sonthal Pergunnahs, for the management of which a special agency has been proposed by the Commissioner. In his report on the subject, Mr. Money says:—

Forest denudation in the Sonthal Pergunnahs.

"The preservation of timber and of wood in the Damin is becoming a matter of serious importance. The Sonthals, in their cultivation of the valleys and low lands, have cut down every tree and shrub, while the Pahareahs, who live on the hills, are denuding them in a few places by cultivation, in most places by reckless cutting of wood, which they sell at the bazar outside the Damin. There are some difficulties connected with the question of this general destruction of timber and wood owing to the Pahareahs depending partly for their livelihood on the sale of wood which they have been always allowed to cut and sell without hindrance, and also to the fact that some Pahareah sirdars have got jagheers, given in the beginning of this century, of large ranges of hills. The difficulties, however, must be faced, or in a few years not only will there be no timber left in the Damin, but wood for the consumption of the people themselves will be wanting."

"In the settlement of Damin now being made, I have taken care to provide for the planting of trees in the low lands."

"For the preservation of those on the high lands, and for looking after the nurseries in the valleys, I recommend the appointment of a special officer."

Suitability of the Damin-i-koh for plantations.

74. Those portions of the Damin-i-koh which border on the valleys of the Gomanee, the Brahminee, the Bansloie and its feeder, the Morel river appear from the map, and from the description given in the Deputy Commissioner's report on the settlement of the Damin-i-koh, to be most conveniently situated and otherwise well adapted for the cultivation of sâl.

75. In the south-east of the Monghyr district, in the Bhaugulpore Division, there are many square miles of country covered with forest or brushwood, but these tracts are held by zemindars under the perpetual settlement.

Forests in the Monghyr district.

76. The Rajshahye Division of Bengal is said to contain no forests of any importance.

Rajshahye Division.

77. In the Cooch Behar Division, besides in British Sikhim and the Bhootan Dooars, there are extensive private forests, within the zemindaries, on both banks of the Brahmapootra, in the Gowalparah district, and also public forests in the Garrow Hills.

Cooch Behar Division.

78. The Commissioner of Cooch Behar informs me that the zemindars of Gowalparah have asserted a right to tax all timber stacked on their estates which has been so interpreted, that it would be impossible to bring any timber from the Government forests of the Eastern Dooars without paying duty upon it on its way to the river Brahmapootra. He informs me that their claim will be resisted, but he thinks it advisable that early application should be made for land required for Government timber depôts on these zemindars' estates at the mouths of the principal rivers.

Claims of Gowalparah zemindars.

SECTION II.

Reserves.

79. By Notification in the Official *Gazette*, dated 13th July 1865, the undermentioned tracts were legally declared to be Government forests, and subject to the provisions of Act VII. of 1865 :—

Public notification and legal declaration relative to the forests in the Sikhim and Bhootan Divisions.

1. "All the forest lands in Darjeeling, (with the exception of the Goompahar Range) at or above an elevation of 6,000 feet, hitherto reserved from sale under the Waste Lands Rules, as notified in the *Calcutta Gazette* of the 21st December 1864, page 2268."

2. "The reserved lands of the Lebong Spur from Mr. Grant's location to Geng."

3. "All the sâl forests in the valley of the Teesta, the Great Rungeet, and the Rumman in British Sikhim."

"Also the sâl forests on the left bank of the Teesta and lying in the recently acquired territory of Bhootan."

4. "All the sâl forests of the Terai districts reserved from sale under the Waste Lands Rules."

80 Paragraphs 3 and 4 of this notification clearly refer to and include the sâl forests both in British Sikhim and in the Bhootan Dooars.

Certain rules were afterwards framed under Act VII. for the management and preservation of the Government forests in British Sikhim, which after receiving legal confirmation were published in the *Gazette of India* of the 15th August 1866.

Forest Rules.

These rules have not been made applicable to the Government forests in the Bhootan Dooars, but are still in force in British Sikhim.

Sikhim Rules.

Draft of new Forest Rules

Rules of more general application have recently been drawn up by the Government of Bengal for the administration of the Government forests in Bengal, and await the confirmation of the Viceroy and Governor General in Council. Copies of both sets of rules are attached to show what has been done for forest legislation in these provinces.

Survey and demarcation of forest tracts in British Sikhim in 1866 by the Revenue Surveyor.

81. All the tracts in British Sikhim declared by the above notification to be Government forests were surveyed in 1866-67 by the Revenue Surveyor and demarcated by the erection of wooden posts. They have also been clearly defined on the Revenue Survey map of the Darjeeling district.

Permanent demarcation required.

There may be some difficulty eventually in identifying the precise boundary lines in some cases, owing to the perishable nature of the wooden stakes used in the demarcation. It seems therefore advisable that paths should be cut afresh next dry season as near as possible to the original survey lines, and that rude stone pillars or posts of sâl timber should be erected at intervals along the boundaries. Without well defined limits there will be great danger of trespass and encroachments on the part of the neighbouring proprietors and of constant disputes arising. The cutting of path-ways round the reserves will also be a preliminary step to the future division and sub-division of these State forests for administrative purposes.

Changes of area.

82. Several changes in the area of the State forests of British Sikhim have taken place since their original demarcation. These consist principally in the addition of forest lands resumed by Government on the terms proposed by the landholder, Mr. Barnes, namely, that the prices at which these lands were sold to him should be placed to Mr. Barnes' credit against certain balances due by that gentleman on account of other purchases.

The area of land relinquished by Mr. Barnes and included in the Government forests is 10,196 acres.

Some reduction in the area of the State forests was also made by the appropriation of the land and small forest situated on the Lebong Spur for the use of the Agent of the Sikhim Rajah and Thibetan travellers in general.

Total area of State forests in British Sikhim.

The total area of the State forests in British Sikhim on hill and plain is about 70 square miles.

Privileges of the inhabitants.

83. The ryots living in or near the Government forests are allowed by the rules to remove grass, bamboos, and wood, except of the reserved kinds for building or thatching their dwellings and other domestic or agricultural purposes.

84. The collection of rents from squatters in the more inaccessible parts of the forests situated in the inner valleys has hitherto been entrusted to the nearest Native Mundul or headman of a village. He is also responsible for the general protection of the tracts made over to his charge.

Some of the hamlets inside the forest reserves are permanent, others are shifting. The cultivation in most cases is carried on in old clearances, and is of a permanent nature. It is intended to prohibit absolutely any new clearances for temporary cultivation within the limits of the State forests.

85. The results of previous valuation, surveys, and estimates of the contents of the Sikhim forests, also the proposed plan of future operations regarding felling and planting, have been given in Section I. of this Report.

Progress of forest reservation in the Bhootan Division.

86. In the Bhootan Division important progress has been made in the preliminary demarcation of reserved forests both in the Eastern and Western Dooars.

87. Four blocks of large extent alluded to in Section I. were demarcated in the Eastern Dooars by the Revenue Survey Department, besides one immediately west of the Sunkoss River called the Dooar Buxa reserve. The area of the four blocks in the Eastern Dooars is about 200 square miles, and the Dooar Buxa reserve covers 8,413 acres, or somewhat more than 13 square miles.

88. The tract last mentioned has been permanently demarcated by the erection of sâl posts a hundred yards apart the whole way round, except on the east side where the Sunkoss River forms the natural boundary.

89. Thirteen other tracts of forests in the Western Dooars have been surveyed by a Revenue Survey Party, and at the same time demarcated by the Forest Department in a similar manner to that described above. The maps of these forest reserves have been applied for but have not yet been received from the Revenue Surveyor, consequently no accurate information can at present be given as to the area included in each.

Estimated extent of sâl forest in the Western Dooars.

The total extent of sâl forest, more or less pure, in the Western Dooars is estimated at about 100 square miles.

Inhabitants.

90. Some of the tracts demarcated contain a few settlers and a little cultivation, but the Commissioner of the Cooch Behar Division informs me that there will be no difficulty in inducing them to remove outside the reserves if the department wish it, and that in one case they have already done so. The requisite negociations for this purpose will be carried out by the Civil Officers.

Joom cultivation prohibited in virgin sâl forests.

91. Joom cultivation or making clearances for temporary cultivation has been prohibited by the Commissioner within the limits of virgin sâl forests; but is still permitted in the jhars or places where it has been practised from time immemorial, and where the jungle consequently consists only of bushes, shrubs, and stunted trees.

Privileges of the inhabitants in the Eastern and Western Dooars.

92. The arrangements under which the villagers in the Bhootan Dooars supply themselves with fuel and wood for domestic and farming purposes have been made by the Commissioner in communication with this Department.

These are as follows:—

"The Meechees and Garrows living in or near the forests are permitted to take sâl and sissoo and other kinds of wood as they have always done in time past for their own use solely, and not for sale, for the purpose of building their houses, for rice mortars, pestles, yokes and ploughs of the descriptions named below, and on the following conditions:—

1st.—"They shall not cut down any sâl or sissoo tree."

2nd.—"They shall only use fallen timber or the stumps of trees remaining on the ground after the tree is felled, or such loppings as remains after the timber has been felled by the Forest Department or persons authorized to cut timber by the Forest Officers."

3rd.—" For house posts they shall only use fallen timber not more than two spans in girth."

4th.—" They shall at once report to the nearest Police Station any attempt to cut or remove timber by persons not having a purwanna, and if in their power shall detain any persons cutting or removing timber till the Police arrive."

5th.—" They shall give all assistance in their power to the Forest Officer for the care of the forests."

Every Meech Sirdar has been furnished with a copy of an order to the above effect, and its provisions have been made applicable alike to residents in the Eastern and Western Dooars.

The Forest Department is likely to benefit greatly by the assistance as forest watchers of men residing near the forests, whose local knowledge and means of obtaining information ought to render them much more efficient than a highly paid stranger. The remnants of sâl and sissoo trees which they are allowed to take gratis will secure the good-will of the population without cost or loss to the department.

Permits for the removal of small pieces to meet local requirements.

93. The following order has also been issued by the Commissioner on the subject of permits to persons to remove for sale fallen timber of descriptions which the Forest Department does not undertake to remove, or to convert loppings and stools into rice mortars, pestles, yokes and ploughs :—

" It is the duty of the Tehsildars to preserve all Government forests and timber in their districts, and to prevent the cutting of any sâl or sissoo trees without the permission of the Officers of the Forest Department."

" The Meechees living in or near the forests have already permission to remove certain fallen timber loppings and stools of trees for their own use only, as in time past, and not for sale."

" All other persons desirous of removing fallen timber may do so on obtaining permission of the Tehsildar, who will give them a pass on payment of duty at the following rates :—

		Rs.	As.	P.
For each	Plough	0	0	6
,,	Yoke	0	0	6
,,	Rice Mortar	0	1	0
,,	Pestle	0	0	3
,,	Loppings for house posts, original length of the branch 1½′ in girth and under ...	0	2	0
,,	Wooden stool made out of tree stool ...	0	0	6
,,	Wooden bowls, &c.	0	1	0
,,	Log of six feet in length	0	2	0

" But it is to be most clearly understood that the Tehsildars have no authority to grant permission for the cutting or removal of any growing sâl or sissoo tree or any timber larger than that specified above, and that no other description of timber may be converted into ploughs, yokes, mortars, &c.

" Persons desirous of cutting down trees or removing timber longer than six feet can only do so by obtaining permission from the Forest Department."

Registers of permits granted.

94. The Tehsildars are to keep Registers (of all permits given) open for the inspection of the Forest Officers, and the permit-holder will be obliged to show his purwanna on demand. The Officer in charge of the Bhootan Division has been requested to report on the practical working of these arrangements. It certainly seems advisable that the petty local demands of the population for sâl timber should be met, and that permits for the removal of small pieces should be given

for this purpose, also that the revenue derived from this source should be collected by the Tehsildars and other receivers of public revenue; but the control of the Forest Officers over these arrangements appears to be at present somewhat defective and susceptible of improvement.

The limits of the Government forests in the Dooars subject to modification.

95. The limits of the Government forests in the Bhootan Dooars cannot be definitely fixed until the proposed investigation, by a Settlement Officer next dry season, into all claims relating to the land shall have been concluded.

In the Eastern Dooars there are several claimants to large areas of country Of these the principal are the Rajahs of Sidlee and Bijnee. The claims made by the former, if recognized, will curtail the limits of the large forest tract proposed for reservation in the Sidlee Dooar, and demarcated for that purpose by the Revenue Survey Department.

Plan of future operations in the Dooars.

96. At the present stage of our knowledge as to the quantity of timber which the Dooar forests contain and its distribution, it is difficult to decide on the best plan of future operations regarding the felling of mature timber and thinnings.

Advantages of concentration and working by rotation.

I observe that Major Pearson, the Conservator of Forests in the North-Western Provinces, strongly advocates the concentration of felling operations in sâl forests on one block, until all the mature trees, except such as will not yield marketable timber, have been removed.

The block must then be closed for a number of years to enjoy complete rest and freedom from cutting as well as immunity from cattle and fires. Excellent results have been obtained from this method in the Central Provinces. The removal of the large trees gives abundant access to the light which young sâl demands.

The growth of the young trees is immediately accelerated, and a forest of young sâl occupies the place of the large trees removed.

I would be inclined to adopt this plan in the Bhootan Dooars and to commence operations in the Buxa forest, which is richer in large trees than any other forest in the Bhootan Division. Efforts will also be directed to the improvement of the reserves by plantations and savings, and to promote the growth of sâl and sissoo by the cutting of creepers and judicious thinning where required, also to favor the natural reproduction of these kinds by the gradual removal of useless trees.

97. Sâl and sissoo appear to be the only kinds of timber exported from the Dooars. Consequently measures for the conservation of other kinds of trees would appear to be at present unnecessary.

The more valuable woods of other kinds in the Dooars are Chalawnee (Gordonia Sp.) Gumbir (Gurelina Arborea), Khair (Acacia Catechu), but they are not much used even locally. The value of the latter, for the manufacture of cutch and the mode of extracting this produce, does not seem to be known to the natives of either the Eastern or Western Dooars.

SECTION III.

PLANTATIONS.

Plantation in the temperate forests.

98. In the temperate forests of British Sikhim the total area of ground planted sown or prepared for cultivation at the close of the year was about 202 acres.

Area planted.

Of this area 33 acres were sown or planted out in January 1868 in prepared spots 6′ × 6′ apart. The proportion of vacancies in this area was found to be about 30 per cent., but these have since been filled up.

Area sown or prepared for planting.

Of the remainder of the 202 acres about 45 acres were sown out in January and February last in prepared spots 6′ × 6′ apart with large leaved oak and chestnut, and the rest of the ground was got ready for the transplanting of seedlings from the nursery beds during the rains.

Nurseries.

99. Nurseries of magnolia and oak were formed last year and have furnished 46,000 strong young plants for transplanting purposes since the present rains set in.

Large nursery beds were also formed in the dry season in various convenient spots and sown with magnolia, oak, and chestnut seed. These have not succeeded so well, but have nevertheless supplied about 25,000 young plants of the kinds abovementioned, which have been planted out at stake since the rains set in heavily.

Seedlings from the natural forests.

The supply from the nurseries having failed, a sufficient number of magnolia and oak seedlings have been obtained from the natural forests, and planted out to fill up the remainder of the ground and to recruit the whole plantation.

100. It is premature to report as to the final result of these planting operations, but the progress made by the plants is not altogether satisfactory. Field rats and squirrels have done a great deal of mischief, not only by eating off the embryos of the young plants in the seed beds, but also in many cases the leading shoots of the young transplants.

A higher degree of cultivation required and the raising of potatoes along with the plants recommended.

101. It would contribute greatly to the success of planting operations if the dense undergrowth which springs up in all plantations after every cutting could be uprooted at the outset, and the whole ground thoroughly hoed without increasing the expenditure in an inordinate degree. This I believe can be effected on the hill tracts of British Sikhim in the most profitable manner by raising a crop of potatoes between the rows of plants. The following is a statement of the probable cost of planting an acre of land with potatoes along with young timber trees, and the expected yield based on information received from old and experienced producers in the District:—

Estimated results of this plan.

Sowing.	Rs.	As.	P.	*Produce.*	Rs.	As.	P.
Cost of preparing an acre of land, forty-two coolies, at 4 annas each ..	10	8	0	For every maund of potatoes sown the ordinary yield is ten maunds. This will give forty maunds from the four maunds sown, and estimating the selling price, at Rs. 2 per maund, the proceeds would amount to Rs. 80. From these figures deduct one-third on account of the space occupied by plants, and the balance will represent the probable produce and proceeds per acre, twenty-six maunds, twenty-six seers of potatoes, at Rs. 2 per maund ..	53	5	0
Cost of sowing four maunds of seed, twelve coolies, at 4 annas each ..	3	0	0				
Cost of collecting crop, twelve coolies, at 4 annas each ..	3	0	0				
Cost of four maunds of potatoes, at Rs. 2 per maund	8	0	0				
To Sundries ..	0	8	0				
Profit per acre ..	28	5	0				
Total .	53	5	0	Total ..	53	5	0

Allowing that the estimate of expenditure is too low and the expectations too sanguine, and assuming that the profits will only be Rupees 15 per acre, this would give a net gain of Rupees 3,030 from the 202 acres of existing plantation if thus treated. This sum would cover more than half the cost of forming the plantation. The experiment is certainly well worth a trial, and has therefore been commenced on a small scale. An acre of ground in two

different parts of the plantation has been hoed up preparatory to the raising of an autumn crop of potatoes. If successful, the experiment will afterwards be tried on a larger scale.

Average cost of forming plantations in British Sikhim.

102. The cost of clearing and planting in the temperate forests of British Sikhim may be reckoned at Rupees 30 per acre.

Teak plantation.

103. A teak plantation was formed last year at Bahmanpokree in the Terai.

The clearance made is about 6 acres in extent, but only a portion of this was planted last year. The remainder has been sown with teak seed since the commencement of the rains.

Of last year's sowing or planting there are 844 young teak trees. The largest plant measures 2′ 6 in height by 3 in girth at 4 from the ground.

Since the rains fell the old plants are looking remarkably healthy, and no deaths have been noticed amongst them. It is too soon to speak positively about the result of the recent sowing, but there are at present numerous vacancies owing in some cases to tardy germination, and in others to entire failure.

Planting preferable to sowing.

104. The result of forming plantation by sowing instead of planting is not generally satisfactory. I think the experience of most planters will corroborate this statement. The method is always precarious, and a plantation formed in this way is generally kept back at least one year. In a country where every open space is immediately occupied by jungle, the failure of the seed to germinate to any extent the first year may make it impossible to reform the plantation during the ensuing year without a greater outlay than the return would justify.

The ill success which has attended the above method has led to its abandonment in Madras. The Nellamboor teak plantations, which are so remarkably successful, are now formed entirely by transplanting.

The latter mode appears to be more certain and better in its results, as well as cheaper and more expeditious than that of sowing.

Experimental teak plantations in the Dooars and Assam.

105. Sufficient teak seed to form an experimental plantation has been sent both to Assam and to the Bhootan Dooars for trial accompanied with instructions.

Both plantations are in course of formation.

Mahogany plantation.

106. The Mahogany plantation at Sookna is gradually improving, but the growth of the trees is comparatively slow. Measurements of growth in height and girth will be kept for the future, from which statistics will be obtained and inserted in next year's report.

Sowings in sâl and sissoo forests recommended.

107. Sâl and sissoo reproduce themselves abundantly. It does not seem necessary therefore to do more towards the improvement and extension of the tropical forests in the Sikhim and Bhootan Terai than to aid nature by sowings in suitable places.

Plantation operations contemplated in other parts of Bengal.

108. There are no doubt many localities in Bengal favorable to the growth of timber trees and conveniently situated for transport to large markets. It is proposed to select a few of these out of those localities in the Patna, Bhaugulpore, and Burdwan Divisions, which have been so strongly recommended for the purpose by Officers intimately acquainted with the places. The advisability of employing a Forester and Arboriculturist from Scotland to superintend operations of this nature, if conducted on a large scale as suggested by the Inspector-General of Forests in his letter to the Government of Bengal, No. 50, dated 25th June 1867, will be considered in connection with this subject.

SECTION IV.

Yield of the Forests.

109. The following quantity of timber has been brought out of the forests of the Sikhim and Bhootan Divisions during 1868-69 :—

Out-turn of timber during 1868-69.

	Sikhim Division.		Bhootan Division.	Total out-turn.
	Temperate Forests.	Tropical Forests.		
Logs	1,334	1,543	881	3,758
Sleepers	...	36,168	259	36,427
Shingles	2,46,103	...	...	2,46,103
Scantlings	...	1,404	...	1,404
Total ...	2,47,437	39,115	1,140	2,87,692

110. It is still found necessary to work the forests by the agency of petty contractors. Large timber contractors, men of sufficient influence and means to undertake as in Burmah the whole work of felling, converting and transporting to depôts, have not yet been found. The continuance and extension of forest operations will no doubt eventually create and develope a better class of Native Foresters who will gradually relieve the Executive Forest Officers of much of that pecuniary care inseparably attendant on timber operations conducted under the present system.

The agency by which the forests are worked.

111. It is hoped also that it may be possible, eventually, to introduce the permit system into some of the forests of Bengal without endangering their strict conservancy.

Prospects of introducing the permit system.

112. An offer has been received from Messrs. K. C. Roy and Co., Calcutta, of Rupees 9 per log for all sâl logs lying in the forest near Buxa not under 6 feet in girth and 25 feet in length on the following conditions :—

1*st.*—The timber to be made over to them or their agents, by the Forest Officer, in the forest.

2*nd.*—The privilege of sawing the timber in the forest to be allowed them.

3*rd.*—Payments to be made prior to the removal of the timber from the district in cash.

4*th.*—All timber removed by them within 12 months from the date of contract to form the subject of the contract, and at the expiry of the term should any timber be left it will remain optional with them to take it on the same terms on a renewed contract.

113. I do not think it would be advisable to accede to these terms, but if Messrs. K. C. Roy and Company or any others are willing to pay a fair amount of royalty and to subscribe to conditions of sale sufficiently stringent to secure, with certainty, the conservancy of the forests they propose to work under the permit system, it might be desirable to enter into an agreement with them, and thus test the operation and effects of that system as applied to the forests of Bengal.

114. To ascertain if the offer of Rupees 9 per log is a reasonable one, it will be necessary to deduct the cost of converting the timber and transporting it to Calcutta from the value at that market, and allow a fair margin of profit to the permit holder.

115. A log, 25 feet long and 6 feet in girth, will give two scantlings 16 inches broad by 8 inches thick, which at Calcutta will, according to Messrs. Mackenzie, Lyall and Company's timber market quotations, realize about Rupees 50 each, or Rupees 100 for the two.

	Rs. As. P.	Rs. As. P.
Market value of one log at Calcutta		100 0 0
Deduct.		
Profit to permit holder, at Rupees 20 per cent.	20 0 0	
Cost of sawing per log	5 0 0	
Transport to Revenue Station	15 0 0	
Transport to Calcutta	30 0 0	
		70 0 0
Balance ...		30 0 0

This calculation gives a balance of Rupees 30, which if the items were correct and none omitted would represent the real value of the timber to Government as it lies in the forest. Probably, however, the timber when sold at Calcutta would not realize quite so much, and the expenses to be incurred by the permit holder may be insufficiently estimated.

A royalty of Rupees 15 per ton for logs and one rupee a piece for sleepers might be a fair rate to charge for the first year, or until further experience indicates whether this is too high or too low. The rate might then be revised.

116. I have no doubt, however, that the Forest Department will be able to make a larger profit by working the forest by contractors or direct Government agency, and the safety of the forests will at the same time be better secured.

Result of experiment of sending sâl timber to the Calcutta market, and probable cause of pecuniary loss on the transaction.

117. It is true that the result of the experiment of transporting sâl logs to the Calcutta market direct by this Department, last year, was not very encouraging as shown in the statement below, but the cause of pecuniary loss on that transaction appears to be that the timber despatched was not of large enough girth or scantling to suit the Calcutta market :—

Quantity and description.	Rate.	Amount.
		Rs. As. P.
40 logs of Sâl timber	Rupees 30 each	1,200 0 0
15 „ „	„ 25 „	375 0 0
41 „ „	„ 21 „	861 0 0
167 „ „	„ 20 „	3,340 0 0
4 „ „	„ 16 „	64 0 0
267 Total ...		5,840 0 0

Expenses incurred in sending the above 267 logs from Siligoree to Calcutta.

	Rs.	As.	P.
Felling and removing, at Rupees 10-8-6 each	2,811	13	6
Carting, at Rupees 8 each	2,136	0	0
Floating, at Rupees 8-8 each	2,269	8	0
Jute for lashing, at Annas 4 per log	66	12	0
Expenses of superintendence	86	12	0
Charges and commission of Messrs. Mackenzie, Lyall and Company ...	520	0	0
Total ...	7,890	13	6
Deduct amount realized by sale	5,840	0	0
Loss sustained by the Department	2,050	13	6

118. The following timber market quotations have been received from Messrs. Mackenzie, Lyall and Company, Calcutta.

Calcutta timber market quotations.

Price of chowkur sâl timber from 24 to 30 feet long, 16 inches to 2 feet broad, and 8 to 12 inches thick, at Rupees 50 to 65 each.

Price of dokur sâl timber 25 to 35 feet long, 3½ to 4 feet in girth, at Rupees 25 to Rupees 35 each.

119. It may therefore still be practicable to introduce with advantage and profit to the Department certain classes of sâl timber of large size into the Calcutta market by careful selection of the most suitable scantlings, and by a reduction, if possible, of the cost of production and transport.

Possibility of renewing the experiment with success.

The attempt might also be made to send timber to Calcutta by the Teesta and Brahamapootra rivers and the tidal streams of the Soonderbuns, offering it for sale at the chief marts on the way. The supply of timber, however, for many years to come will not probably be more than sufficient to meet the demands of places much nearer the sources of supply than Calcutta.

120. The operations in the tropical forests of the Sikhim Division were confined principally to converting timber into Railway sleepers.

Timber operations in the tropical forests.

The advantages of transforming sâl timber into sleepers are—

1st.—That there is a large quantity of timber in the forests situated in localities whence it cannot be removed in logs, and which therefore can be utilized only by converting it into sleepers.

Advantages and disadvantages of sleeper cutting operations.

2nd.—That there is less waste in sawing timber into small scantlings than into large.

3rd.—That small scantlings are more portable.

4th.—That there is always a demand for Railway sleepers.

The disadvantages are—

1st.—That timber available for more generally useful purposes is often sacrificed by being cut up into sleepers.

2nd.—That unless great attention be bestowed on the converting process a large proportion of undersized and otherwise inferior sleepers are obtained which being rejected by the Railway Contractors are almost unsaleable.

3rd.—The Railway Companies will not, as a rule, deal directly with the Forest Department. This Department is compelled therefore to sell the Railway sleepers to contractors who can only afford to pay such prices as will leave them a fair margin of profit when the sleepers are again sold to the Railway Companies.

The profit to the department on such transactions is not more than about one Rupee on each sleeper, and this profit is almost, if not altogether nullified by the quantity of rejected sleepers always left on hand.

It seems advisable, therefore, to carry on sleeper cutting operations only so far as is necessary to utilize timber, which owing to its situation is not available for conversion into scantlings of more general utility.

The difficulties experienced in floating sâl timber.

121. There are unfortunately almost insurmountable difficulties to contend with in floating timber down the Teesta River.

1*st*.—In the fact that sâl will not float, and must therefore be buoyed up by bamboos lashed to it.

2*nd*.—In the existence of numerous obstructions composed of large rocks projecting above the water and a succession of rapids.

Lastly.—In the sudden freshets which come down with irresistible rapidity and invariably carry away the cane work boom stretched across the river at the rope station to stop timber as it floats down.

Proposed measures for removing these difficulties.

122. Nothing but an iron chain cable buoyed across the surface of the river can possibly bear such a strain as that above described, and it is intended to make a boom of this kind next dry season at the rope station of Sivok.

The rocky obstructions can only be removed by blasting, but this will be attended with great difficulties. The rocks are always more or less submerged, and much of the blasting will have to be done under water. Some degree of engineering skill will therefore be required to superintend these operations. Application will be made for the necessary skilled labor, and strenuous efforts will be exerted to overcome these difficulties.

Timber transport in the tropical forest.

123. In the tropical forests of Sikhim timber is conveyed by manual labor to forest depôts where most of it is converted by Nepalese sawyers into sleepers, there being at present only a limited supply of timber so situated as to be available for other purposes.

Timber depôts.

124. The principal forest depôts in the Sikkim Division are Sookna on the Mahanuddy and Sivok on the Teesta at the points where these streams emerge from the hills. Thence the scantlings are usually carted to the main timber depôt at Siligoree on the Mahanuddy, where they are stored and sold on indent.

Logs are occasionally floated down the Mahanuddy and stored either at Siligoree or lower down that river, at a depôt established at Bakomaree near Kishengunge, where there are at present 964 logs on hand, intended chiefly to meet the requirements of the Public Works Department.

Felling operations.

125. Upwards of 1,000 sâl logs have been felled in the Teesta valley, out of which 447 have been brought to the river bank. These will not be launched until effective measures have been adopted to prevent the loss of timber by constructing a strong boom at the rope station.

Recovery of lost timber.

126. Of the timbers lost in transit in 1867-68, and shown in this year's timber account, 100 logs have been recovered, and some more will doubtless be found.

127. 704 logs have been brought out of the Loharguree Forest between the Mechi and Balasun Rivers, and collected near the cart tracks.

Waif timber.

The principal portion of these logs were felled to all appearance many years back, but they are all sound seasoned timber, and though not of a large girth, are well adapted for bridging purposes.

128. 423 splendid logs of Pinus longifolia are lying on the bank of the Great Runjeet ready for launching, and will be brought out when floating operations in the Teesta have been facilitated.

Pine logs.

129. In the Temperate Forests 1,599 logs of oak, chestnut, and magnolia, including those shown in the statement of timber brought to depôts, have been felled and stacked on the old Darjeeling road in order to season.

Timber operations in the Temperate Forests.

The object of felling so many trees was to meet the want of seasoned timber hitherto greatly felt in the district, as well as to make room for plantations. These logs were nearly all cut from matured and large sized trees, and their cubical contents amount to 69,041 cubic feet.

Timber from the Temperate Forests of British Sikkim is dragged or rolled down the slopes by Nepalese coolies and stored along the side of the old Darjeeling road, where it is sold on indent as required for local purposes.

Timber operations in the Bhootan Division.

130. In the Western Dooars, timber is brought out of the forest as in Sikkim by departmental agency.

131. A timber depôt has been established at Domohoni where the Dolla stream joins the Teesta, but it is proposed to remove it to Julpigooree, the Head-Quarters of the Civil as well as of the Forest Division, and the principal mart for timber.

Timber Depôts.

It is also intended to have a depôt at Falacotta on the Mooznai, and one near Aliporc on the Kaljanee.

These are both important places in the Division, and are situated near the line of timber transport from the richer forests.

Water-ways.

132. The streams available for floating timber in the Western Dooars are—

1. The Teesta.
2. „ Johldoka.
3. „ Mooznai.
4. „ Torsa.
5. „ Kaljanee.
6. „ Sunkoss River.

133. In the Bhootan Division the timber operations carried on during the year under review have been limited.

134. Of the timber felled during Mr. Dale's incumbency in the Rajahdangah Forest 525 logs have been carted into the Domohni Depôt, and the rest is in course of conveyance to the bank of the Cheel River, whence it will be floated down to the same depôt.

Rajahdanga Forest.

135. In the Mooraghat Forest 200 first class sâl trees have been felled to meet the requirements of the Civil Authorities.

Mooraghat Forest.

A fair weather road has been made through this forest, and arrangements have been made to remove all wind falls and waif timber (of which there is a large quantity) to the junction of the Mooznai and Doodoo Rivers whence it can be floated to the Fallacotta Depôt.

Five hundred logs, about three feet in girth, have been already collected, and eight canoes have been constructed on which to float this timber to the depôt.

136. In the forest near Buxa a portion of the timber felled by Messrs. Queiros and Company, under contract with the Forest Department, has been removed to the bank of the Deema River, whence it will be floated to the Alipore Depôt.

Buxa Forest

137. Arrangements have also been made for working the sâl forest on the left bank of the Teesta.

Teesta valley

138. Goalundo, which is situated at the junction of the Ganges and Brahampootra Rivers, and is the proposed terminus of the Eastern Bengal Railway, will probably be the best place for the establishment of a main depôt for Government timber from the Assam and Bhootan Forests intended for the Calcutta market.

Goalundo.

SECTION V.

FINANCIAL.

139. The following figures show the actual financial results of the transactions of the Forest Department during the year 1868-69 :—

Actuals of 1868-69

	Rs.	As.	P.
Receipts	1,71,184	7	1
Expenditure	1,26,256	7	0
Surplus, Rs. ...	44,928	0	1

140. To this balance, in favor of the Department, should be added the difference between assets and liabilities at the commencement and close of the year, amounting to Rupees 68,586-1-1.

Total net revenue.

The sum of these amounts, namely, Rupees 1,13,514-1-2 represents the net revenue realized by the operations of this Department during the year under review.

141. It is usual also to give this Department credit in the provincial accounts for the collections of forest revenue made by the District Officers in the various Divisions of Bengal. Details of these collections, which amounted during the year under review to Rupees 53,362-4-1, are given below :—

Forest revenue collections made by District Officers.

Name of Districts.	Particulars of revenue.		Amount.
			Rs. As. P.
Julpigoree ...	Licenses for trapping wild Elephants in the Bhootan Dooars forests		980 0 0
Jessore ...	Rent of privilege of collecting forest produce, and cutting timber in the Soonderbuns		1,016 0 0
		Rs. As. P.	
Nowgong ...	Fees paid for license to collect caoutchouc	3,450 0 0	
	Licenses for trapping wild Elephants ...	620 0 0	
			4,070 0 0
Kamroop ...	Licenses for trapping wild Elephants ...	.....	80 0 0
Khasi and Jynteah Hills.	Fees for cutting timber in the Jeerung forests	.....	150 0 0
Durrung ...	Fees for cutting timber	1,024 0 0	
	Fees paid for licenses to collect caoutchouc	1,300 0 0	
	Licenses for trapping wild Elephants ...	260 0 0	
			2,584 0 0
Cachar ...	Lease of right to levy tolls on timber and forest produce at the Sealtekh transit ghât..	.. ...	11,035 0 0
Gowalparrah ...	Sale of or duty on timber, and fees for cutting timber	4,777 0 0	
	Licenses for trapping wild Elephants ...	740 0 0	
			5,517 0 0
Luckimpore ...	Fees paid for licenses to collect caoutchouc	8,100 0 0	
	Licenses for trapping wild Elephants ...	400 0 0	
			8,500 0 0
Garrow Hills ...	Fees for cutting timber in the timber Mehals	... ..	362 13 0
Godda ...	Sale proceeds of fire-wood ...	.....	49 0 0
24-Pergunnahs ... / Backergunge ...	Rent of privilege of collecting forest produce and cutting timber ...	7,305 0 0 / 397 0 0	7,702 0 0
Rajmehal ...	Fees for cutting fire-wood ...	.....	500 0 0
Chittagong ...	Lease of right to levy tolls on timber, &c.	.....	10,816 7 1
	Total ...	.....	53,362 4 1

142. The sum obtained by the addition of these figures to those of the annual departmental account, will represent the total surplus revenue derived from the forests of Bengal during 1868-69, amounting to Rupees 1,66,876-5-3.

Grand Total of Net Revenue.

143. The following Comparative Statements show the value of timber in hand at the beginning and end of the year. The valuation in both has been made at the same rates, and these rates have been fixed on the principle of giving the full value of timber on hand at the main depôts, such as Rungbool, Silligoree, Backomaree, and Domohni, but the actual expenses only of timber lying in the forest depôts.

Valuation of timber in hand.

Statement of value of timber on hand on the 1st April 1868.

Description of timber.	Quantity. Number of pieces.	Quantity. Cubical contents.	Estimated selling rate per 100 cubic feet.	Estimated value.
In Station Depôts.			Rs. As. P.	Rs As. P.
Logs	88	1,936	150 0 0	2,904 0 0
Sleepers	9,473	32,233	2 6 0 each	22,498 0 0
Planks	810	2,041	100 0 0	2,041 0 0
In Forest Depôts.				
Logs	4,636	1,01,584	34 4 0	34,792 0 0
Sleepers	21,631	73,604	44 1 3	32,443 0 0
Planks	303	763	22 5 0	170 0 0
Shingles	3,01,860	56,447	1 13 11	1,055 0 0
Scantlings, running feet 865	.....	233	22 5 0	51 0 0
Total ...	3,38,801	2,68,841	.....	95,954 0 0

Statement of value of timber on hand on the 31st March 1869.

Description of timber.	Quantity. Number of pieces.	Quantity. Cubic contents.	Estimated selling rate per 100 cubic feet.	Estimated value.
In Station Depôts.			Rs. As. P.	Rs. As. P.
Logs	1,548	35,155	150 0 0	52,732 0 0
Ditto	311	13,570	62 8 0	8,481 0 0
Ditto	608	29,935	50 0 0	14,967 0 0
Carlie kumbers ...	365	.....	0 4 0 each	91 0 0
Saplings	2,312	.....	0 3 10 each	553 0 0
Shingles	1,04,000	19,448	3 0 0 per 1,000	312 0 0
Sâl sleepers ...	17,076	58,105	2 6 0 each	40,826 0 0
Oak	114	374		
Scantlings ...	10	40	100 0 0	40 0 0
In Forest Depôts.				
Logs	3,949	1,27,949	34 4 0	43,822 0 0
Sleepers	42,097	1,43,244	44 1 3	63,139 0 0
Total ...	1,72,390	4,27,820	.....	2,24,963 0 0

144. Of the actual departmental revenue, amounting to Rupees 1,71,184-7-1, only Rupees 32,153-12-6 were received in cash. The balance was adjusted by book transfer, being the proceeds of timber sold to the Public Works Department.

Book transfer receipts

145. All timber belonging to this Department has hitherto been sold on indent only. In the absence of any local timber market, the selling price is at present regulated by the Schedule of Rates drawn up and submitted by Mr. Leeds last year, and sanctioned provisionally by the Government of Bengal.

Timber sales.

146. No auction sales have been held, as there is no great demand for timber at present, and all local wants are easily and cheaply supplied from the private forests.

These however will, ere many years elapse, be completely exhausted. In order, therefore, to meet the pressing wants of future years, it will be the duty of this Department to lay by annually as much seasoned timber as the Government forests can yield without trenching on the capital, and at the same time go on re-planting.

Reduction in timber expenses.

147. Statement No. VII shows a decrease of about one rupee per ton in the cost of felling, converting and transplanting timber, as compared with that of the preceding year.

The whole of the charges under "conservancy" and "direction" are entered in this year's Statement of timber expenses. This, and the fact that the cost of the Assam Establishment has been included, will account for the larger amounts shown under these heads, as compared with those of last year.

There is, however, an actual reduction in the cost of timber production and transport, apparent in the transactions of the Department for 1868-69, as compared with previous years, and there is every reason to hope that the Financial Statement for the ensuing year will show still further economy in all the branches of timber operations,

Past payment system introduced.

148. The system of making advances to contractors has, to a great extent, been stopped, and part payments on the value of work done have been substituted.

It is intended to lay in supplies of the necessaries of life at the forest depôts in the neighborhood of which timber operations are being carried on, and where markets are a long way off. These stores will be served out to the petty contractors for the use of the coolies, and will answer the purpose of part payments better than money. This system will also ensure the steady continuance of the work.

SECTION VI.

General.

Tours of Inspection.

149. During the year under review, the Conservator, Mr. Henry Leeds, made tours of inspection through the Bhootan and the Assam Forest Divisions.

Changes of Directing Officers.

150. Prostrated by repeated attacks of fever, contracted during these journeys, he was at length compelled to proceed to Europe, in February last, on sick leave for fifteen months.

From the 16th of February to the 12th of May the Secretary to the Government of Bengal officiated as Conservator.

On the latter date the present Officiating Conservator, who was transferred from the Forest Department in Burmah, assumed charge of this Office.

Proposed establishment for Assam, Dacca, and Chittagong.

151. With a view to the organization of forest conservancy operations in the forests of Assam, Dacca, and Chittagong, the sanction of Government has been solicited to the establishment of a branch of the Forest Department on a suitable scale in each of these Divisions.

Proposed arrangement of the Forest Divisions in Bengal.

152. It will probably be found convenient to combine the Bhootan Dooar forests, west of the Sunkoss River, with the Sikhim forests, and form them into one division, with its head-quarters at Julpigooree, and the Eastern Dooars and Lower Assam forests into another division, with its head-quarters at Gowalparah. The present arrangement, by which the Eastern Dooar forests are incorporated in the Bhootan Division, is not satisfactory, because these forests are at too great a distance from Julpigooree to be controlled effectively.

153. The forest divisions of Bengal might then be arranged as follows :—

1*st*.—Sikhim and Bhootan Division, co-extensive with the Civil Districts of Darjeeling and the Western Dooars.

2*nd*.—Lower Assam Division, including the Gowalparah, Kamroop, Durrung, and Nowgong Districts, and the outer hills of the Garrow, Khasi and Jynteah range.

3*rd*.—Upper Assam Division, including the Luckimpore, Seebsaugor, and Naga Hill Districts.

4*th*.—The Dacca Division, co-extensive with the Districts of Cachar and Sylhet.

5*th*.—The Chittagong Division.

154. When these Divisions shall have been formed, the head-quarters of the Forest Department in Bengal will have to be established in a central position as regards the forests. Cherra Poonjee on the Khasi Hills appears to be more centrally and conveniently situated, in this respect than any other place, but the communication is believed to be at present rather irregular at certain seasons of the year.

155. In the other Divisions or Commissionerships of Bengal, the forests, as far as they are under Government control, will, it is supposed, be managed by the District Officers, with the assistance of an efficient Executive staff, and under the general direction of the head of this Department, until the direct administration of some of them can be undertaken.

WM. STENHOUSE, *Lieut.*,
Offg. Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual Summary of Revenue and Expenditure in the different Divisions during 1868-69.

Classification.	Direction.	Sikkim Division.	Bhootan Division.	Assam Division.	Chittagong and Cachar.	Behar Division.	Total.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
REVENUE.							
I.—Sale of timber at Depôts ...	... ...	1,64,651 12 1	917 0 0	..	... ...	... .	1,65,568 12 1
II.—Sale of timber removed by purchasers...	... ...	3,404 7 0	... ...	... ...	... ...	... ..	3,401 7 0
III.—Duty on Foreign Timber ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
IV.—Permit Fees ...	... ...	765 8 0	... ...	... ...	... ...	... ...	765 8 0
V.—Grazing Dues and Fisheries	... ...	916 4 0	... ...	... ...	... ...	... ...	916 4 0
VI.—Sale of Fruits, Babool pods, &c.	... ...	... ...	... ...	... ...	... ...	... ...	... ...
VII.—Sale of confiscated Timber	... ...	... ...	... ...	... ...	... ...	... ...	... .
VIII.—Fines and Forfeitures ...	... ...	198 8 0	... ...	... ...	.. ...	. .	198 8 0
IX.—Miscellaneous . .	... ...	305 0 0	10 0 0	16 0 0	.. ...	... ...	331 0 0
Total ...	... ...	1,70,241 7 1	927 0 0	16 0 0	... ...	... ..	1,71,184 7 1
EXPENDITURE.							
A.—Conservancy and Working.							
I.—Timber expenses ...	... ...	68,470 11 0	6,118 11 0	113 11 0	... ...	... ...	74,703 1 0
II.—Purchases of Stock and Cattle	... ...	8,080 2 0	30 0 0	184 8 0	... ...	... ...	8,294 10 0
III.—Feed and keep of Cattle ...	... ...	568 3 0	171 9 0	476 4 0	... ...	... ...	1,216 0 0
IV.—Rent of leased Forests ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
V.—Charges in collecting revenue on Grass, &c.	... ...	... ...	... ...	... ...	... ...	... ...	... ...
VI.—Plantations ...	... ...	2,868 6 0	... ...	... ...	... ...	... ...	2,868 6 0
VII.—Forest work ...	... ...	816 7 0	... ...	... ...	.. ...	... ...	816 7 0
VIII.—Forest Survey ...	... ...	... ...	58 12 0	980 12 0	... ...	... ...	1,039 8 0
IX.—Experiments on Timber ...	... ...	... ...	... ...	... ...	... ...	... ...	.. ...
X.—Communications and Buildings	... ...	6,485 3 0	157 13 0	... ...	...	... ...	6 643 0 0
Total Conservancy and Working ...	... ...	87,289 0 0	6,536 13 0	1,755 3 0	... ...	... ...	95,581 0 0
B.—ESTABLISHMENTS.							
I.—Salaries ...	14,587 7 0	8,927 10 0	618 14 0	1,600 0 0	... ...	. . ...	25,733 15 0
II.—Allowances ...	1,834 6 0	1,308 0 0	... ...	437 0 0	... ...	... ...	3,579 6 0
III.—Contingencies ...	625 5 0	592 14 0	50 0 0	93 15 0	... . .	... .	1,362 2 0
Total Establishments ...	17,047 2 0	10,828 8 0	668 14 0	2,130 15 0	... ...	... ...	30,675 7 0
Grand total of Expenditure ...	17,047 0 0	98,117 8 0	7,205 11 0	3,886 2 0	... ...	... ...	1,26,256 7 0

DARJEELING,

The 30th June 1869.

W. STENHOUSE, *Lieut.*,

Offg. Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Dr. *Annual Abstract Account of the Cash transactions of the Forest Department for the year* 1868-69. *Cr.*

Year.	Heads of Account.		Amount.	Year.	Heads of Account.	Amount.
			Rs. As. P.			Rs. As. P.
1868-69	To Cash balance in hand on 1st April 1868 ...		1,591 14 3	1868-69	By Expenditure of the Department	1,26,256 7 10
	„ Revenue received in cash ...	32,153 12 6			„ Book transfer on account of Timber made over to Public Works Department ...	1,39,030 10 7
	By Book transfer ...	1,39,030 10 7	1,71,184 7 1		„ Remittances to State Treasuries	39,329 2 4
	„ Remittances from State Treasuries ...		1,36,349 13 4		„ Re-payments of Deposits	0 0 0
	„ Deposits		0 0 0		„ Advances made	3,539 10 2
	„ Advances recovered		6,430 0 6		„ Refund of Revenue	0 0 0
	„ Subscriptions from Mr. Mann and Mr. Caddy to Uncovenanted Service Family Pension Fund ...		396 6 0		„ Cash balance in hand on 31st March 1869 ...	7,796 10 3
	Total ...		3,15,952 9 2		Total ...	3,15,952 9 2

W. STENHOUSE, *Lieut.*,

Offg. Conservator of Forests, L. P.

DARJEELING;
The 30*th June* 1869.

FOREST DEPARTMENT, BENGAL.

Annual Statement of Outstandings and Liabilities of the Department on account of Contractors and Disbursers for the year 1868-69.

Particulars.		Department Debtor.			Department Creditor.			Balance due.	
		At commencement of year.	Recoveries in cash and value of supplies and work done during year.	At close of year.	At commencement of year.	Payments made during year.	At close of year.	To Department (Outstandings.)	By Department (Liabilities.)
		Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Carting timber	Sikkim ...	738 2 0	21,217 4 0	21,955 6 0	17,293 0 0	9,539 12 0	26,832 12 0	4,877 6 0	.....
	Bhootan ...	.....	897 3 1	897 3 1	.....	978 0 0	978 0 0	80 12 11	.....
Sawing timber	Sikkim ...	239 8 0	11,064 4 11	11,303 12 11	6,826 6 6	6,481 7 5	13,307 13 11	2,004 1 0	.....
	Bhootan ...	.....	.....	.....	700 0 0	61 4 0	761 4 0	761 4 0	.....
Felling and floating timber	Sikkim ...	3 8 0	11,604 8 11	11,608 0 11	3,830 1 2	10,135 2 9	13,965 3 11	2,357 3 0	.....
	Bhootan ...	.....	868 5 0	868 5 0	1,000 0 0	5,060 0 0	6,060 0 0	5,191 11 0	.....
Communications	Sikkim ...	893 10 0	3,839 6 9	4,733 0 9	1,247 0 3	3,572 8 9	4,819 9 0	86 8 3	.....
	Bhootan ...	.....	.....	.....	.....	.....	.....	.....	.....
Plantations	Sikkim ...	.....	1,270 14 9	1,270 14 0	.....	1,270 14 9	1,270 14 9	.....	.....
	Bhootan ...	.....	.....	.....	.....	.....	.....	.....	.....
Total ..		1,874 12 0	50,761 15 5	52,636 11 5	30,896 7 11	37,099 1 8	67,959 9 7	15,358 14 2	.....

DARJEELING,
The 30*th June* 1869.

W. STENHOUSE, *Lieut.*,
Offg. Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Statement of Timber brought to Depots from the different Forest Divisions during 1868-69.

Name of River or Division.	Forest.	Description of Timber.	Pieces.	Cubic feet.	Total of each River. Pieces.	Total of each River. Cubic feet.	Remarks.
Sikkim.							
Terai	Rayeng ...	Sleepers	4,252	14,468			
		Scantlings	338	1,079	4,590	15,547	
	Sookna ...	Sleepers	31,172	1,06,071			
		Scantlings	1,066	2,264			
		Logs	338	6,525	32,576	1,14,860	
Teesta River	Sivok ...	Sleepers	744	2,531			
		Sal logs	501	11,469	1,245	14,000	
	Lohargurie ...	Ditto	704	21,756	704	21,756	
Great Rungeet River ...	Sikkim ...	Pine logs	423	40,626	423	40,626	
Hills	Rungbool ...	Oak	177	9,555			
		Magnolia	85	3,541			
		Chesnut	303	12,802			
		Cupassi	73	3,739			
		Kowla	273	13,100	911	42,737	
		Shingles	2,46,103	46,021	2,46,103	46,021	
		Scantlings Rg. ft. ...	93	25	93	25	
Bhootan ...	Domanee ...	Sal logs	873	17,460			
		Pine „	8	768			
		Sleepers	259	881	1,140	19,109	
				Total ...	2,87,692	3,14,681	

Darjeeling,
The 30*th June* 1869.

W. STENHOUSE, *Lieut.*,
Offg. Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual Timber Account for 1868-69.

Particulars.	Pieces.	Total.
I.—Stock in hand at the following Depôts at the commencement of the year—		
Gadagaree, Logs	419	
Siligoree, Logs 88, Sleepers 9,400, Planks 810	10,298	
Sivok, Sleepers	114	
Rhonee, Sleepers	100	
Sookna, Logs 4,317, Sleepers 18,961, Planks 303	23,481	
Mahalderam, Sleepers	132	
Teesta, Sleepers	2,324	
Rungbool, Sleepers	4	
Jore Bungalow, Shingles	3,01,860	
Doomanee, Sleepers	69	
Chuttuckpore .. ... Running feet ... 666		3,38,801
Old Darjeeling Road ... ... „ ... 199		
Total, Running feet ... 865		
II.—Timber received at Depôts from the Forests—		
Rayeng, Sleepers 4,252, Scantlings 338	4,590	
Sookna, Logs 338, Sleepers 31,172, Scantlings 1,066	32,576	
Sivok, Logs 501, Sleepers 744	1,245	
Lohargurrie, Logs	704	
Great Rungeet, Logs	423	
Rungbool, Logs 911, Shingles 2,46,103	2,47,014	
Doomanee, Logs 881 Sleepers 259	1,140	
Scantlings ... ... Running feet ... 93		2,87,692
Total, Running feet ... 958		
Total ...	.....	6,26,493

Particulars.	Pieces.	Total.
I.—Timber removed by Purchasers from Depôts—		
Logs 1,730		
Sleepers 11,100		
Planks 1,316		
Khalakumbers 400		
Saplings 1,639		
Shingles 4,37,236		
Scantlings ... Running feet ... 958	4,53,471	
II.—Timber lost and used by the Dept.—Logs	632	4,54,103
III.—Stock in hand at the close of the year at the following Depôts—		
Gadagaree, Logs	128	
Bakomaree, Logs 964, Saplings 306	1,270	
Lohargurrie, Logs	704	
Great Rungeet, Logs	423	
Rungbool, Logs 911, Sleepers 114, Scantlings 10, Shingles 1,04,000	1,05,035	
Rayeng, Sleepers	5,305	
Sivok, Logs 501, Sleepers 763	1,264	
Sookna, Logs 2,193, Sleepers 36,025	38,218	
Siligoree, Logs 369, Sleepers 16,817, Saplings 2,006	19,192	
Doomanee, Logs 588, Sleepers 259	847	1,72,390
Total ...	.....	6,26,493

DARJEELING,
The 30*th June* 1869.

W. STENHOUSE, *Lieut.*,
Offg. Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Statement shewing the amount realized on account of the different classes of Timber sold during 1868-69.

Divisions.	Number of Logs sold.	Cubical contents.	Amount realized and due on account of timber sold.	Average amount per Log.	Average Cubical contents of Logs.	Average amount per 100 Cubic Feet.
Sikkim.						
Timber sold to private Parties.						
Logs	338	6,525	5,347 7 6	15 13 1	19' 4" 10"'	81 15 3
Sleepers	10 000	34,027	20,000 0 0	2 0 0	3' 4" 10"'	58 12 5
Saplings	1,251		279 10 0	0 3 6	.....	...
Timber sold to Public Department.						
Logs	1,415	47,881	71,958 3 0	50 13 7	33' 10" 0"'	150 4 6
Sleepers	1,100	3,742	7,018 3 8	6 6 0	3' 4" 10"'	187 8 10
Planks	1,316	3,316	6,220 15 9	4 11 7	2' 6" 2"'	187 9 8
Scantlings, Running feet 958	..	262	164 8 7	....	.....	62 12 9
Shingles	4,37,236	81,763	1,748 15 1	3 15 11 per 1,000	187 per 1,000	2 2 2
Saplings	488	.....	139 2 0	0 5 1	.....	.....
Khalakumbers	50	.....	70 9 4	1 6 7	.....	.....
Bhootan.						
Logs or posts	12	.....	42 0 0	3 8 0	.....	.....
Khalakumbers	350	.....	875 0 0	2 8 0	.....	.....
Total ..	4,53,506	.....	1,13,858 10 11	.....	.....	.....
Deduct amount due but not realized during the year			.....	.....	.....	...
Add amount realized on account of former years			51,710 1 2	.....	.....	.
Total shewn as Revenue on account of Timber sales ...			1,65,568 12 1	.....	.....	.....

Remarks.	Pieces.
Timber sold in previous years remaining unremoved at the commencement of the year	.....
Timber sold during the year	4,53,506
Total ...	4,53,506
Timber remaining unremoved at the close of the year ..	.....
Balance removed from Depôts by Purchasers during the year	.....

W. STENHOUSE, *Lieut.*,

Offg. Conservator of Forests, L. P.

Darjeeling,

The 30*th June* 1869.

FOREST DEPARTMENT, BENGAL.

Statement shewing the amount expended on account of Timber received from the different Forest Divisions during 1868-69.

Name of Division.	Number of Logs.	Cubical contents.	Timber expenses.	Conservancy expenses, cost of Establishment, &c., of the Department, excluding direction.	Total amount expended, excluding direction.	Average amount paid per Log.	Average Cubical contents per Log.	Average paid per 100 Cubic Feet.
Sikkim and Bhootan—								
Logs	3,758	1,41,341	34,451 9 1	13,960 2 11	48,411 12 0	12 14 1	37' 7" 3"'	34 4 0
Sleepers	36,427	1,23,951	38,548 5 3	16,092 2 9	54,640 8 0	1 8 0	3' 4" 10"'	44 1 3
Shingles	2,46,103	46,021	602 15 2	258 6 7	861 5 9	3 8 0 per 1,000	187' per 1,000	1 13 11
Scantlings... ...	1,404	3 343	421 10 0	421 6 0	1,404 0 0	1 0 0	2' 4" 6"'	41 15 11
Ditto Running feet, 93	...	25	3 14 6	1 10 9	5 9 3	6 0 3 per 100 Rg. ft.	27' per 100 Rg. ft.	22 5 0
Assam	...	...	.....	3,886 2 0	3,886 2 0			
Total ...	2,87,692	3,14,681	74,589 6 0	34,619 15 0	1,09,209 5 0			
Add Direction charges					17,047 2 0			
Grand Total ...					1,26,256 7 0			

Remarks.

Abstract rate per 100 *Cubic Feet.*

	1867-68.	1868-69.
Timber expenses	25 10 6	23 11 3
Conservancy and Establishment ...	3 1 0	11 0 0
Direction	0 12 0	5 6 8
Total ...	29 7 6	40 1 11

Darjeeling,
The 30*th June* 1869.

W. STENHOUSE, *Lieut.*,
Officiating Conservator of Forests, L. P.

Annual Account of Forest Revenue for the year 1868-69.

	Rs.	As.	P.
Receipts	1,71,184	7	1
Expenditure	1,26,256	7	0
Surplus ..	44,928	0	1
Add difference between assets and liabilities at the commencement and close of the year ...	68,586	1	1
Net Revenue ...	1,13,514	1	2

Note.—To the above sum, which shows the actual financial result of departmental transactions during the year, the revenue collected on forest produce by the District Officers in the Lower Provinces, amounting to Rupees 53,362-4-1, may be added. This will raise the net revenue to Rupees 1,66,876-5-3.

Detail of difference between assets and liabilities at the commencement and close of the year.

	At the commencement of the year.	At the close of the year.	Difference.	
			In favor of the year.	Against the year.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Value of timber	95,954 0 0	2,24,963 0 0	1,29,009 0 0	.....
Ditto elephants	2,575 0 0	7,525 0 0	4,950 0 0	.....
Outstanding on account of sales to public Departments	51,710 1 2	.....	.....	51,710 1 2
Outstanding on account of sales to Darjeeling Municipality	318 8 5	318 8 5	.....	.....
Outstanding on account of excess payments to Contractors	29,021 11 11	15,358 14 2	.....	13,662 13 9
Total assets ...	1,79,579 5 6	2,48,165 6 7	1,33,959 0 0	65,372 14 11
Deduct liabilities	.....	.....	65,372 14 11	... ..
Balance ...	.....	.....	68,586 1 1	.....

Conservator of Forests' Office,
Bengal, L. P.,
Darjeeling,
The 30th June 1869.

Wm. Stenhouse, *Lieut.*,
Officiating Conservator of Forests, L. P.

Appendix to the Progress Report of the Forest Department in Bengal for 1868-69.

Contents.

1. Report on the forests of the Kamroop District in Assam, north of the Brahmapootra, by G. Mann, Esq., Assistant Conservator of Forests.

2. Report on the forests of the Durrung District, Assam, by G. Mann, Esq., Assistant Conservator of Forests.

3. Report on the caoutchouc tree in the Durrung District, Assam, by G. Mann, Esq., Assistant Conservator of Forests.

4. Report on the forests in the Luckimpore District, north of the Brahmapootra, by G. Mann, Esq., Assistant Conservator of Forests.

5. Report on the forests on the south side of the Brahmapootra not inspected.

6. Copy of the forest rules in force in British Sikhim.

7. Draft of rules for the administration of the Government forests in the Lower Provinces of Bengal not yet passed.

WM. STENHOUSE,
Offg. Conservator of Forests, L. P.

The forests in the Kamroop District, (North Bank of the Brahmapootra only.)

Komlabaree sâl forest.

1. In that part of the Kamroop District which lies north of the Brahmapootra, there is absolutely no forest left in the plains except a small patch of sâl, of about 300 acres, near the village of Komlabaree, about 14 miles north of Bhobaneepore.

2. There are only a few large trees above six feet in circumference in it, but the young sâl stands very close, and is of vigorous growth, containing on an average 300 trees per acre.

3. This forest should be reserved and improved by thinning out so as to procure mature timber from it, which, sooner or later, will be wanted for bridges in this part of the country.

The Dewangiri forests.

4. The hills in the immediate neighbourhood of Dewangiri, extending over an area of about 72 square miles, are partly covered with mixed forests, containing large trees of over 6 feet circumference and of various descriptions, of which the better kinds are the following :—

"Cham" (Artocarpus Chaplasha), Tita Champa (Michelia Champaca), "Gunserai) "Camphora Glandulifera), "Gomaree" (Gmelina Arborea), "Googra" (Gordonia Mollis) Bandor Candaha (Dubanga Sonneratioider)

The Bhootan Hills beyond British Territory.

5. The hills in the Bhootan Territory, west of Dewangiri, and immediately above the plains, are very barren, and present the appearance of having been under cultivation at some time or another. Sâl is not found in them, neither in the Dewangiri hills, and the forests in general appear to be very scattered.

6. The only use that has ever been made of the timber trees growing on the Dewangiri hills has been the cutting of canoes or dug-outs, and their inaccessibility in fact prohibits any other use being made of these woods at present, since the cost of transport to the waterway would be more than could be realized from them afterwards.

The cutting of canoes.

7. The cutting of dug-outs cannot be termed anything but waste of timber, but I fear it will have to be permitted for some time longer even in reserved forests, until forest operations are more advanced, and economy can be taught the natives, to whom the use of canoes and boats is indispensable. Rash interference with the manufacture of canoes would no doubt inflict great hardships on the inhabitants, whose chief means of transport is by water, roads being bad, and the use of carts in consequence almost unknown.

8. The canoes brought from the outer hills, Bhootan Territory, immediately above the plains, are smaller and inferior to those seen in the Gowalparah District, and do not amount to more than about 140 yearly, which are brought down the following rivers :—

Pahoomaree	Nuddy	..	..	..	..	40
Kaldea	ditto	..	..		..	60
Bur	ditto	..	..	..	..	40

9. On the right bank, or the north side of the Brahmapootra, there are the following hills, parts of which are still Government property, and have scattered sâl or other timber trees on them as well as bamboos :—

The forests on the hills opposite Gowhatty.

1. The Haleemora Hill.
2. „ Hazoo „
3. „ Shanparra „
4. „ Gunoomon „
5. „ Cula „
6. „ Agnahtoorec „
7. „ Madertolla „

10. These from their proximity to the town of Gowhatty are of greater importance, and should therefore have some care bestowed on the reserving and guarding of them to supply the immediate wants of the station.

11. The felling of sâl on these hills should be discontinued at once, and the improvement of the latter forests by felling of worthless trees growing amongst the sâl be commenced; whilst the mixed forests, in which "Tita Champa" (Michelia Champaca), "Gunsorai" (Camphora Glandulifera), "Googra" (Gordonia Mollis) form the better kinds of timber, could only be improved by plantations.

12. Owing to their inaccessibility, however, they are not worth improving in the above way, as the difficulty of removing timber from them will make it much more expensive than timber to be procured near water-carriage, for which reason all forest plantations should be carried on on the plains and in the proximity of water-carriage only.

Improvement of mixed forests not advisable.

13. The felling and removing of timber have been interdicted since November 1864, and no revenue is being collected on this account.

Felling and removing of timber interdicted.

14. The Department of Public Works are, on applying to the Deputy Commissioner, allowed to fell and remove timber required for public purposes, free of any charges, and the natives are permitted to fell and remove timber for their own wants but not for trading in, or exportation from the district.

15. The following measurements of trees were taken in Gowhatty, which, although from a very small number of trees, are sufficient to show that plantations on better positions and on better soil are most desirable at least of teak and sissoo.

Measurements of teak, sissoo, and nahor trees in Gowhatty.

16. Nahor has been generally over-rated, and, although a most valuable wood for posts for native huts, is, from its generally small size, slow growth, and pliability when used in great lengths, and weight, inferior to many other kinds of timber, and not worth cultivating.

17. - All the sâl forests in the Kamroop District, on the north bank of the Brahmapootra, should be strictly reserved, whilst the mixed forests on the Dewangiri Hills, and on the hills opposite Gowhatty, should, be considered as open or district forests only.

18. In this district also two forest watchers were placed to procure specimens of timber, and to note any destruction of forest produce, that such might be brought to the notice of the civil authorities.

(Sd.) G. MANN,
Asst. Conservator of Forests,
on Special Duty to Assam.

Measurement of Teak, Sissoo, and Nahor Trees in Gowhatty in January 1869.

Teak Trees (Tectona Grandis) planted in 1836-37.

Number of trees.	Height of measurement above ground.	Circumference. Ft. Ins.	Remarks.
1	1 Foot above ground ...	10 0	
	3 Feet above ground	8 3	
	5 Ditto ...	7 4	
2	Ditto ..	12 2	
		11 7	
		13 0	Just below the first fork.
3	Ditto ..	6 6	
		5 1	
		4 7	
4	Ditto .	6 5	
		5 7	
		5 6	
5	Ditto ...	8 1	Includes small branches grown out of the trunk.
		6 9	
		7 1	Just below the first fork.
6	Ditto	7 8	
		7 10	
		8 10	About 6 inches above the fork.
7	Ditto ...	6 8	
		5 10	
		6 3	
8	Ditto .	6 10	
		6 1	
		5 11	
9	Ditto ...	6 11	
		6 1	
		5 9	
10	Ditto ...	8 4	
		7 10	
		8 7	
Average.	Ditto ...	8 4	
		7 1	
		7 3	

Sissoo Trees (Dalbergia Sissoo) planted in 1838.

Number of trees.	Height of measurement above ground.	Circumference. Ft. Ins.	Remarks.
1	1 Foot above ground	7 7	
	3 Feet above ground	6 6	
	5 Ditto .	6 3	
2	Ditto ...	8 1	
		6 8	
		6 2	
3	Ditto	9 6	
		7 9	
		7 2	
4	Ditto ...	7 1	
		6 1	
		5 9	
5	Ditto ...	8 3	
		6 7	
		6 0	
6	Ditto ..	8 4	
		7 3	
		6 7	
7	Ditto	9 6	
		7 8	
		7 0	
8	Ditto	9 8	
		8 0	
		7 3	
9	Ditto	9 10	
		8 0	
		7 4	
10	Ditto ...	9 3	
		7 11	
		7 7	
Average	Ditto ..	8 8	
		7 2	
		6 8	

Nahor Trees (Messua Ferrea) planted in 1829.

Number of trees.	Height of measurement above ground.	Circumference. Ft. Ins.	Remarks.
1	1 Foot above ground ...	5 4	
	3 Feet above ground ..	5 7	
	5 Ditto ..	3 0	The two measures of the fork.
		3 11	
2	Ditto ...	4 6	
		4 0	
		3 8	
3	Ditto ..	4 0	
		3 6	
		3 6	Above first large branch.
4	Ditto ...	1 5½	... ... Numbers 4 and 5 were probably planted later.
		1 4½	
		1 3½	
5	Ditto ...	2 3½	
		2 0	
		2 3	Below first fork
6	Ditto	4 6	
		4 3	
		4 4	
7	Ditto ...	3 10	
		3 4½	
		3 4	
8	Ditto ...	4 5	
		3 10	
		3 11½	Above first branch.
9	Ditto	3 1	
		2 10½	
		3 1	Just below the first fork.
10	Ditto ..	4 3	
		4 2½	
		4 0½	Above first branch.
Average	Ditto	3 9	
		3 6	
		3 7	

The Teak and Nahor trees were all extremely short in the stem, as can be seen from the remarks, having grown in open spaces as ornamental trees, and therefore never having had anything in the way of prunning done to them.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Kamroop District.*

Heads.	Items of Revenue.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
	FORESTS.								
A.	Sale of or duty on timber, and fees for cutting timber	2,523	2,477	2,061	1,688	1,840	.....	.....	.....
B.	Caoutchouc	.....	.....	.....	.....	.....	.....	.....	.....
C.	All other forest produce ...	.....	.....	.....	.....	.....	.....	.....	.....
D.	License to catch elephants ...	.....	.....	.....	.....	40	80	180	140

(Sd.) G. MANN,

Assistant Conservator of Forests, on Special Duty to Assam.

Forest Revenue collected from 1860-61 *to* 1864-65 *in the Kamroop District. A sale of or duty on timber and fees for cutting timber.*

Number.	Names of Mouzahs.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	REMARKS.
1	Rameedooar ...	173	130	225	141	142	Chiefly sâl and some mature trees still standing.
2	Chaygaondooar ...	145	145	...	60	64	Only small sâl left; other forests abundant.
3	Bokodooar ...	47	47	47	62	31	Chiefly sâl, but few first class trees left.
4	Bangaon ...	277	277	277	277	143	Chiefly sâl; some mature trees left.
5	Bugaie ...	473	473	397	220	234	Ditto ditto more accessible than the former.
6	Pautan ...	501	501	501	501	601	Almost exclusively sâl.
7	Bordooar ...	405	405	200	68	150	Chiefly sâl, but greater part in possession of Lower Assam Tea Company.
8	Bholagaon ...	166	166	125	70	73	Abundance of young sâl.
9	Mowrapore ...	181	181	181	181	181	Some sâl forests; large extent of mixed forest.
10	Beltolla ...	12	9	...	...	...	But few sâl forests; mixed forests abound.
11	Domreah ...	17	17	...	...	20	Ditto ditto.
12	Panbaree ...	18	18	...	...	...	Abundance of sâl and mature timber left.
13	Lokeedooar ...	108	108	108	108	201	Only young sâl left in the forest.
	Total ...	2,523	2,477	2,061	1,688	1,840	

(Sd.) G. MANN,
Asst. Conservator of Forests, on Special Duty to Assam.

The Forests in the Durrung District.

The Durrung District.

19. The forests in the Durrung District are very extensive covering about 585 square miles, and have to be considered under two different aspects, *viz.* :—

1*st.*—As timber producing forests; and

2*nd.*—As Caoutchouc forests.

Situation of forests.

20. They may be enumerated as follows :—

1.	The Khaling Borugoma and Koruaparah Dooars Forests		.. 40	square miles.
2.	The Chardooar	" "	.. 220	ditto.
3.	The Nowdooar	" "	.. 200	ditto.
4.	The Chydooar	" "	.. 125	ditto.

The timber forests in the Durrung District.

21. From the first point of view they are very inferior, the better kinds of timber being very scarce.

These are the following :—

The better kinds of timber.

Sâl (Shorea robusta.)
Cham (Artocarpus Chaplasha.)
Poma (Cedrela Toona.)
Tila Sappa (Michelia Champaca.)
Nahor (Messua Ferrea.)
Gunserai (Camphora Glandulifera.)
Uriam (Andrachne Trifoliata.)
Gomaree (Gemelina Arborea.)
Bola (Marlea Sp.)
Makreeah (Gordonia Mollis.)
Koir (Acacia Catechu.)
Koroi (Abbizzia odoratissima.)
Phool Supa (Michelia oblonga.)
Phool Hingoree (Echinocarpus tiliaceus,)
Bur Hingree (Castanopsis tribuloides.)
Hilika (Terminalia Citrina.)
Amaree (Terminalia Tomentosa.)
Sonaroo (Cassia Fistula.)
Parellee (Bignonia chelonoides.)
Gohorah (Vitex pubescens.)
Borthekra (Garcinia pedunculata.)
Kockon (Dnabanga Soneratiodes.)
Himool (Bombax Malabaricum.)

The Khaling. Boreegoma, and Koreeaparah Dooars.

22. The forests in the Khaling, Boreegoma, and Koreeaparah, Dooars, in the Mungledye Sub-Division, take, as a rule, the names of the rivers on the banks of which they are situated, and cover, as above stated, a comparatively small area, not more than 40 square mile, for part of which applications have been made by tea planters.

23. They contain the above named timber trees in fair proportions, and khair or koir is abundant on the banks of the Kallapany, Noonaee, and Dunseeree Nuddees. No sâl or sissoo is found in any of the above Dooars.

Rivers draining the above forests.

24. They are drained by the following rivers which are gravelly, and dry in the cold season for about 6 to 10 miles below the hills, and unfit for the transport of timber except in the shape of canoes.

1. The "Bur Nuddee,"
2. „ "Sookla Nuddee,"
3. „ "Kallapanee,"
4. „ "Noonaee Nuddee,"
5. „ "Kaurung Nuddee,"
6. „ "Golandah Nuddee," and
7. „ "Dunseeree Nuddee.

Canoes exported

25. About eighty canoes are brought from the above forests annually, of which twenty come down the "Sookla Nuddee," forty down the "Noonaee," and twenty down the "Dunseeree Nuddee."

Khair or Koir forests.

26. Khair or Koir is the wood preferred by the blacksmiths for the manufacture of charcoal, whilst the tea planters use whatever is most handy without any regard to quality.

The Chardooar forests.

27. The Chardooar forests are the most extensive in the district, covering about 220 square miles, and are, with the exception of the Baleeparah sâl forest, wet evergreen forests, with a dense luxuriant vegetation, amongst which occur every where a fair percentage of useful trees of all sizes; and one cannot but regret that the difficulty of access and scarcity of labor do not as yet let the working of these forests be remunerative.

28. As forest operations become more developed, it may yet be found that the enormous quantities of inferior timber in these forests, and the semul growing in the neighbourhood of the Brahmapootra and on the churs in this river, may be turned to account and prove serviceable for Railway sleepers if creasoted.

Rivers draining the above forests.

29. These forests are drained by the following rivers :—

The "Roota Nuddee,"
„ "Debur Nuddee,"
„ "Punchuar Nuddee,"
„ "Chapaye Nuddee,"
„ "Beelseeree Nuddee,"
„ "Gobhooroo Nuddee,"
„ "Bar Jaolee."
„ "Manseree Nuddee, and
„ "Bhorolee River."

30. The latter is a fine large stream with deep water in it all the year round, and well adapted for floating operations, and as it is situated between the two largest forests in the district, the Chardooar and Nowdooar forests, it may be the means of working a large portion of these forests, besides having banks well adapted for forest plantations.

Timber formerly exported by the Bhorolee river.

31. It is stated that formerly large quantities of timber used to come down this river, which was felled and brought out by the Kacharees, a tribe of much the same habits and occupations as the Meechees. A few Meechees also used to come up this river to fetch timber, but for the last two years only about sixty canoes were brought down this river annually. About the same number are brought down the "Roota Nuddee." These realize from Rupees 12 to Rupees 20 each.

Sometimes a canoe of unusual size is brought down these rivers by the Meechees and and realizes Rupees 40.

32. The sâl timber from the Becleeparah forest used to be brought down by the "Manseera Nuddee" to the Bhorolee river and thence to the Brahmapootra.

33. There is a small patch of sâl saplings near the village of Gorascamaree, north of Tezpore. On account of its isolated position, small size, and the very irregular way in which the saplings are distributed over it, this patch is not worth reserving.

The Nowdooar forests.

34. The forests in the Nowdooar are very similar and nearly equal to those in the Chardooar, but somewhat drier and less accessible as far as water-carriage is concerned.

They extend over about 200 square miles and are drained by the "Mor Noe" and "Geeladharee," "Borugayne," "Burgayne," and "Behalee" Nuddees, in all of which there is but little water in the cold weather, but they are said to be formidable streams during the rains.

No timber or canoes exported.

35. No timber or canoes of any kind are exported from these forests, owing partly to want of water-carriage and partly to the very scanty population.

The Chydooar forests.

36. The Chydooar forests extending over 125 square miles are much inferior to those in the Nowdooar, and form in some parts only a narrow belt of not more than four miles in width at the foot of the Himalayas.

No timber or canoes exported.

37. These forests are drained by the Jeeahmor Noe and Marra Mor Noe, but no timber or canoes are exported, which here as in the Nowdooar may be attributed to the sparseness, and, to judge by the rich magnificent lands lying barren and unused, also to the inactivity of the population.

Soom forests first appear.

38. Small clumps of Soom forests appear for the first time in this Dooar, but like the timber forests are not much used.

General remarks. Timber inferior; labor expensive.

39. Most of the timber in the Durrung District is not of sufficient value to bear the ordinary cost of removing it to a market. Few, if any, of the inhabitants of the district could be induced to work out large timber at reasonable and remunerative rates, while imported labor is too expensive and unsatisfactory. In most instances the using of it is impracticable, since it would not pay the Department or any contractor to work out timber by daily labor, and none of the imported coolies could be induced to work out timber by task work.

40. An imported cooly's pay comes to about Rupees 7 per mensem, if the expense of importing, the limitation of time of service, the rates at which the food has to be supplied to him, and other matters are considered. Such a cooly can comfortably complete his task on tea estates by working three to four hours a day. At this rate timber would indeed have to be very valuable to bear the expense of such labor being employed for dragging it for miles through the forest, which would be necessary, as there are no roads anywhere near the forests, and carts are never used, and to most of the inhabitants unknown. Moreover, the cattle of the country being the most wretched, are quite unfit for timber dragging or carting.

Working Establishment necessary.

41. The only chance there seems to be of making any use of these and other forests on the north side of the Brahmapootra in Assam, is by the Department starting a working establishment with the requisite number of good elephants and buffaloes for dragging timber. After the work has been

carried on for one or two seasons, these animals might be made over to contractors, and timber be extracted through their agency.

Working of these forests not advisable at present, except for local consumption.

42. This even must be considered at present as undesirable, since timbers of inferior descriptions (such are most of the kinds in the forests) do not as yet realize prices high enough to make such operations at all remunerative. As there are no other grounds on which these forests should be worked, such as improvement of them by the removing of mature timber, the lands should merely be protected and the clearing of them prohibited as being tracts suited for forest plantations of more valuable kinds of timber than are borne by them at present, and which, if removed at greater cost, might still be very remunerative, and produce a large revenue to the state.

43. The more valuable kinds of timber trees are so scattered, and have such abundant space for growing, that the working out of the mature trees would not prove of material benefit to the young trees left, and unless superior kinds of timber, such as teak and sâl, become scarce in the market, the use of the timber in these forests will be limited; by the cost of its removal, to local consumption only.

The character of the forests.

44. The character of the forests varies constantly, and seldom, if ever, permits a very accurate estimate being made of their contents as to species or quantity, without a regular valuation survey; and whilst, perhaps, one mile may be found to contain a large proportion of useful timber trees, the next twenty may be gone over without noticing anything but useless scrub intercepted by swamps, impenetrable cane, and other undergrowth, or open grass plains with only useless trees, not even serviceable for firewood.

Estimate of useful timber trees in the forest.

45. This irregular distribution of trees in the forests has proved a very great obstacle to forming anything like a correct idea of their value, and any estimate of their contents must therefore be accepted for what it is, *viz.*, a rough estimate of the proportion of those kinds of timber which might be made use of to those which must be considered as quite useless.

46. For this purpose the kinds of trees on apparently average ground were frequently counted, the result of which showed about 20 per cent. of useful trees of the sum total in the best parts containing about 100 trees per acre, which are generally the tracts immediately along the hills; and this proportion is reduced to 10 per cent. if the forests are over six miles from the hills, or along the banks of rivers where the cutting of canoes has been carried on for ages.

This is again reduced to half that number, or 5 per cent., where forests extend further than ten miles from the mountains where they are frequently intercepted by open plains, and become at their outskirts nothing but useless scrub, which frequently forms a belt of several miles in width.

Natural reproduction of better timber trees.

47. Natural reproduction of the better kinds of timber in these forests cannot be reckoned on.

It may always be considered a safe guide, and accepted as a general rule, which holds good in all instances where virgin forests or forests nearly such are under consideration, that only those kinds of timber will naturally reproduce themselves which, in the course of the natural distribution of plants, appear over large areas or in patches as pure or nearly pure forests, *i. e.*, such as form a forest of one or several species from which the general vegetation of the surrounding country is excluded, and remain masters of the ground once in their possession.

48. This latter in itself proves the ability of the species, not only to hold its own, but to master other species, if soil and position are otherwise suited ; and if a sufficient number of mature trees for the shedding of seed are left on the spot, they will naturally reproduce themselves.

49. No forests, like the mixed forests in the Durrung District, where there seems a general struggle for life and space, can ever be expected to reproduce themselves in this way, as with the isolated parent trees, the protection of the seedlings of the same species is removed, and seedlings will rapidly succumb to those species of trees left, and the dense luxuriant undergrowth is unfavorable, and in most instances ruinous, to seedlings without a parent tree or natural protector.

The improvement of forests.

50. The improvement of such forests by assisting the seedlings to come up, in making room for them, is not advisable, as in most instances the expense of doing so, and the comparatively small out-turn of timber from such areas would make them more unprofitable than plantations. Besides, irregular forests distributed over large areas are more difficult to control and to work, dividing the attention of those who look after them more than it should be, whilst the result must always be doubtful.

Plantations.

51. The improving of the forests in the Durrung in their present condition, by cultivating the kinds of timber at present produced in them on spots which may be found here and there comparatively open and suited for improvement, would not be advisable either for the above reasons; but as the greater portion of them occupy excellent ground and rich soil, regular plantations could be started with great advantage in positions where timber can be made available for the market at the least expense.

52. But few trees offer sufficient advantages to adopt such a measure, still there are several kinds which, by the superiority of their timber, their easy propagation, and their rapid growth, are suited for this purpose.

In the tropical forests of this province there are the following :—

1*st.*—The teak (Tectona grandis.)

2*nd.*—The sissoo (Dalbergia sissoo.)

3*rd.*—The cham or sam (Artocarpus chaplasha.)

4*th.*—The toon (Cedrela toona.)

For low and swampy situations the "Ajhar" (Lagerstroemia reginae) may be added to the above.

53. Whilst teak, cham and toon will do on all ground from 10 to 15 feet above the underground water in the rains, with a good average soil, such as loam, or alluvial deposits of sufficient depth, and a rich mould on its surface, sissoo will thrive in almost any light soil no matter how poor, and does remarkably well even where pure river sand and gravel lie close under the surface, and water stands in the rains generally immediately below, and often covers the surface, so long as there is sufficient under-drainage to prevent the water getting stagnant, which latter seems to be indispensible for its development.

54. The banks of all the rivers suited for floating timber, and even of the Brahmapootra and the churs in the Brahmapootra, where there is no danger of their being washed away, are particularly well adapted for sissoo plantations.

Cost of plantations.

55. The average cost of getting up forest plantations by local or imported labor would be as follows :—

Forest clearing and planting.

	Rs.	As.	P.
First clearing of land per acre	25	0	0
Making of holes for the plants at 6' × 6' per acre	7	0	0
Cutting of sticks for the plants, 3 sticks per plant per 1 acre ...	3	8	0
Planting of seedlings (by daily labor) ditto ...	7	0	0
Preparing of nursery for seedlings to plant 1 acre ...	0	8	0
Total	43	0	0

Subsequent cultivation during the first four years.

	Rs.	As.	P.
Hoeing six times during the year, 1 acre	21	0	0
Superintendence of one Moonshee for every 240 acres, at Rs. 20 per mensem for 1 acre	1	0	0
Pay of one peon for every 50 acres, at Rs. 7 per mensem for 1 acre	1	10	10
Tools and repairing of them for 1 acre	0	5	2
Total	24	0	0

56. This would be equal to an average of Rupees 34-12 per acre yearly for the first four years, which would make the cost of every sapling after four years 1 anna 10 pie, provided there are no vacancies.

57. This expenditure although high would still be a sufficient inducement to carry out plantations on a large scale, since from the measurements of teak in Gowhatty there can be no doubt of the climate in Assam being suitable, and sissoo, cham, and toon being indigenous.

58. It is also most probable that some of the tribes who engage in the cultivation of waste lands could be induced to sow or plant timber trees amongst their crops, and thereby reduce the expenditure to a mere trifle. The cultivation of cereals and other crops between the lines of timber trees by the coolies employed by the department no doubt could also be carried out and thereby the expenditure be greatly reduced.

Forest land cultivation.

59. The only forest land cultivations in the Durrung District are the tea estates, and a few patches of cultivations cleared by the Bhooteahs in the western, and by the Duphalas in the eastern part of the district. Their fields, however, do not much exceed in size the space occupied by their huts, and they live generally on the river banks immediately at the foot of the hills.

No encroachments on the forest from the former cultivations take place in the Durrung District, as they generally have more than they require on their own estates for the present.

The Bhooteahs and Dhuphalas should be kept within certain limits, and, if possible, their fields made use of for forest plantations.

Fires.

60. Fires do not occur in these forests since the continual evergreen vegetation and excessive moisture in them do not let them spread, even if kindled.

The Baleeparah sâl forests.

61. These are the general features of the Durrung forests which are moist, damp, evergreen mixed forests, the only exception being the Baleeparah sâl forest, twenty miles north of Tezpore and four miles south of the hills, of about three square miles. All first class trees have been worked out of this forest, and it should be closed and reserved at once, as it is the only sâl forest in the Durrung District from which the local requirements for the Public Works Departments could be met in future, and like all other sâl forests contains a considerable number of dry posts being the upper portion of trees left in the forest.

Use made of the Durrung forests.

62. The only use made of the forests in the Durrung District hitherto by the Natives has been the cutting of inferior canoes, and the felling of small quantities of sâl posts from the Baleeparah forests, the former of which were exported and the latter used for public works, whilst posts for Native huts and wood for domestic and farming purposes were removed, for their own use only, by the inhabitants.

Trees levied on timber

63. On those trees which are felled for exportation the following fees are levied by the Mouzadars, who receive 10 per cent on their collections.

	Rs.	As.	P.
Trees of sâl, titta sappa, phool sappa, from 48 to 56 feet in length, and chiefly used for canoes	4	0	0
Ditto ditto ditto 36 to 48 feet in length ...	2	8	0
Trees of other kinds fit for canoes from 39 to 48 feet in length	3	0	0
Ditto ditto ditto 36 to 42 feet in length	1	8	0
Trees of hard wood for posts for house building of 4 to 5 feet circumference ...	2	0	0
Ditto ditto ditto 3 feet circumference ...	0	8	0
Trees fit for beams for houses	0	2	0
Trees fit to be sawn into narrow planks	1	0	0
Trees ditto ditto broad ditto	1	8	0

Two forest watchers were placed in this district to report any excesses which might be committed in the caoutchouc forests.

The rearing of the lac insect.

64. The "pakree" tree (Ficus cordifolia) is extensively cultivated by the people in the Durrung District near the villages for the purpose of rearing the lac insect, and the joree pakree (Ficus camosa) common in the forests is frequently used for the same purpose, and should therefore be reserved as well as the caoutchouc tree.

Conservancy of forest.

65. As before stated the Baleeparah sâl forest should be strictly reserved, and closed at once.

All the other forests in the Durrung District might either be reserved or kept as open forests, as in either case sufficient control can be exercised over them to prevent the destruction of reserved timber, or other trees and shrubs, as well as forest produce in general, and the Forest Department can carry out such planting operations as might be desirable.

The only river banks which specially recommend themselves for forest plantations, beyond the actual forest land, are those of the "Bur Nuddee" and the Bhorolee River.

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special Duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867 68 *in the Durrung District.*

Item of Revenue.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
Forest.								
A.—Sale of or duty on timber, and fees for cutting timber ...	95	111	42	1,087	981	562	158	520
B.—Caoutchouc ...	...	..	..	1,525	1,012	...	..	...
C.—All other forest produce ..	...	..	..	...	...	...	..	...
D.—License to catch elephants	...	..	..	...	...	120	60	240

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special Duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Durrung District. A. sale of or duty on timber and fees for cutting timber.*

Names of Mouzahs.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
Balceparah	71	43	18	1,081	450	545	12	45
Gargaree	10	...	..	..	..	...	30	...
Chapie	14	...	..	2	31	2	...	9
Seeragolee	..	68	..	..	23	.	..	130
Geelmagaw	..	...	24	..	..	..	84	...
Satea	..	...	..	1	..	..	...	...
Mazbut	..	...	..	3	..	..	7	...
Boopanara	..	...	..	..	5	..	...	...
Orang	..	...	..	..	472	..	20	45
Panpoor	..	...	..	..	..	7	...	4
Haleegurh	..	...	..	..	..	8	...	...
Botholabohota	..	...	..	..	..	..	5	6
Bansbarec	..	..	..	..	..	..	...	80
Belallee	..	...	..	..	..	..	...	129
Behogoree	..	...	..	..	..	..	...	70
Bishunath	..	...	..	..	..	..	...	2
Total ...	95	111	42	1,087	981	562	158	520

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special Duty to Assam.

From G. MANN, ESQ., Assistant Conservator of Forests, on Special Duty to Assam, to the Secretary to the Government of Bengal, Revenue and General Departments, in charge of Office of Conservator of Forests, Lower Provinces,—(No. 33, dated Debrooghur, the 3rd April 1869.)

SIR,

WITH reference to the correspondence noted in the margin, I have the honor to submit the report and Sketch Map on the Rubber Trees in the Durrung District, Assam, called for by the Conservator.

From the Deputy Commissioner, Durrung District, Assam, to the Commissioner of Assam, No. 546 of the 8th October 1868.
From the Commissioner of Assam, to the Secretary to the Board of Revenue, Lower Provinces, No. 314, dated 19th October 1868.
From the Officiating Junior Secretary to the Board of Revenue, Lower Provinces, to the Conservator of Forests, Lower Provinces, No. 4455A., dated 4th November 1868.
Letters from the Conservator of Forests, Lower Provinces, to the Government of Bengal and the Board of Revenue, Lower Provinces.

Timber and other forest questions regarding the Durrung District will be noticed in the Progress Report hereafter, as requested.

Specimens of rubber manufactured in the Durrung District have been despatched this day to your address by Dâk Banghy.

Report on the Caoutchouc Tree in the Durrung District, Assam.

THE India rubber or Caoutchouc tree (*Ficus elastica*) is found along the foot and in the low tropical valleys of the Himalayas, from the Mechi River or Nepaul boundary at 88° east longitude to the extreme eastern boundary of Assam, 97° east longitude, as well as along the foot and in the low valleys of the southern mountains of the Brahmapootra Valley, *viz.*, the Patkye Mountains, Naga, Khasi, Jynteah, and Garrow Hills, which countries favor the growth of this and other figs, or banyan trees, by their moist atmosphere, and enable them to luxuriate and become the most conspicuous members of these often impenetrable virgin forests.

Enumeration of Caoutchouc forests.
Geographical range of the Caoutchouc tree.

They are sometimes met with near villages planted for the sake of the shade of their spreading branches and exceedingly handsome leaves, but not with an intention to procure Caoutchouc from them.

In Assam, the latter was first manufactured and exported from the Durrung District, where it has attracted considerable attention for many years past; and it was from there it was first brought to the notice of Government that the trees were getting exhausted, and that many of the trees producing this valuable commodity had been destroyed through indiscriminate tapping by the men who made their living by it, and who were naturally encouraged in doing so by the person who had the privilege or monopoly of purchasing it.

It is to the Durrung District, therefore, that this report especially refers, although the observations and suggestions will apply more or less to the whole of the Assam Valley on account of the forests in which the Caoutchouc tree grows being all of the same description and the localities very similar.

"The Caoutchouc forests in the Durrung District."

Although the tree is found as far west as the Nepaul boundary, it is not abundant until east of the Bor Nuddee, which is the western boundary of the Durrung District, where it is common in the forests at the foot of the hills in the Khaling, Booree, Goma, and Kooreeaparah Dooars, between the Bor Nuddee and Moora Dhunseeree Nuddee, and has been exported for many years from these forests, which extend over about 40 square miles; as well as from the low valleys of the Bhootan Hills immediately above them, and especially from the forests in the neighbourhood of the exit of the Noonae Nuddee in the Khaling Dooar and the adjoining hills, and those between the Deemajang and the Rootah Nuddees.

Khaling, Booree, Goma, and Kooreeaparah Dooars' forests.

The privilege of collecting the rubber in the Government forests between the Bor Nuddee and the Moora Dhunseeree Nuddee was sold to Mr. C. P. Bruce, of Mungledye, for one year, from the 1st of May 1863, for Rupees 1,525; but the time for collecting was limited from the 1st of November 1863 to the 30th of April 1864, to prevent injury to the trees by overtapping, and under the condition that he should plant 400 trees in the forests abovementioned to provide for the loss of trees through injury.

In the following year, the privilege was sold for Rupees 1,012 to Kyahs in the Mungledye Bazar, who purchased about 2,500 maunds of rubber, but had not the slightest control over the tapping of the trees, and encouraged the latter as much as was in their power to obtain the largest possible quantity during the short time they held the monopoly of buying it, as consistent with their interest, without any regard, however, for future supplies, which was of most disastrous consequence, in as far as it induced the men who tapped and collected the rubber to indulge in the most outrageous wholesale destruction of these valuable trees, by either felling them with axes, or, if this was too troublesome, to collect firewood and burn them down, so as to render the operation of tapping more convenient than it would have been had the trees been left standing; and several hundred magnificent trees were counted, in all directions, lying on the ground with cuts across their trunks and roots from 6 to 18 inches long, 3 inches broad, and a foot to 18 inches apart, and smaller cuts on the upper branches of them, by which all that they could yield was extracted immediately after they were felled, with an utter disregard for future wants, whilst only three small trees were noticed alive during the inspection of the forests on the left bank of the Noonaee Nuddee at its exit from the hills. The forests in the Kooreeaparah Dooar are but little better, so that at present there is absolutely no rubber worth speaking of to be got from these forests, nor for centuries to come, unless the tree is re-planted, as its natural re-production is exceedingly slow owing to the peculiar way in which the Rubber tree begins its existence, a description of which may not be out of place here, since it is also the cause of rendering the trees in their natural condition so difficult of access, and inducing the men to act as recklessly as they did in collecting the rubber.

Owing to the density of the forests and close undergrowth in them, the seed of the Caoutchouc tree seldom, if ever, germinates on the ground, but usually between the upper branches of other trees, which peculiarity places the young Rubber trees when germinating at once from 40 to 60 feet above the surface of the ground.

In this epiphytical mode they exist until their aërial roots descend the trunk of their original supporter and reach the ground, when these roots increase rapidly in size and number, and soon are larger than the trunks of the tree on which the plant germinated, which is frequently enveloped and completely hidden under the roots of the Rubber tree.

These aërial roots also descend afterwards from the branches of the trees, and were seen of 7 and 8 feet circumference, 20 feet distant from the main or centre mass of roots, which form the apparent trunk of the tree when getting older.

This centre mass of roots varies much in size according to circumstances, and has been seen when very compact measuring 51 feet in circumference, and the crown of the same tree measured 180 feet in diameter.

A fine specimen felled and lying on the ground, and which had a single stem, measured 16 feet 3 inches in circumference, 30 feet above the ground.

"Chardooar Forests."

Travelling eastward, the next forests are those in the Chardooar, between the Moora Dhunseeree, or Rootah Nuddee and the Bhoralee River, which are very extensive, covering about 220 square miles, and have not been as recklessly handled as those noticed before.

In these forests, between the Beelseeree and the Gobhoroo Nuddees, Rubber trees are found as far as sixteen miles from the hills; but as the distance from the hills increases, and the atmosphere in which the tree grows gets drier, the quantity of rubber to be obtained from a tree decreases; and whilst it is stated by the men who fetch it from the hills that one tree is able to produce from 2 to 3 maunds, the men who gather it from the forests at the foot of the hills only get from 20 to 30 seers per tree, and if far away from the hills, only half the quantity is obtained, especially if the ground is gravelly or otherwise severely drained.

Still further east, after crossing the Bhorolee River, are the Nowdooar forests, between the Bhorolee River and the Behalee Nuddee, which are nearly of the same extent but drier than those of the Chardooar, and covering about 200 square miles, still the Caoutchouc tree is abundant, close to the hills, and the good Rubber manufactured in former years by Messrs. Martin, Ritchie and Company, of Tezpore, was got exclusively out of this and the Chardooar, for which the above firm held the exclusive privilege of collecting for fifteen years, from the 1st of January 1852, free of payment, under the condition that rubber should only be collected between the 1st of November and the 30th of April, and that yearly 200 Caoutchouc trees should be planted 60 feet apart in the above forests, to provide for losses of trees through injury done to them by the gatherers.

As before stated, these forests have not been worked so recklessly as those before noted, and no trees were seen felled or burned down; still it is evident that every ounce of rubber procurable was tapped out of the trees, and it is said that the above firm discontinued the collecting of rubber a year before their lease expired, as no more rubber could be obtained at remunerative prices, and this statement is quite borne out by the appearance of the trees, which have not yet recovered, although three years have elapsed since the tapping was discontinued. East of the Nowdooar are the Chydooar forests, extending from the Behalee Nuddee to the Moorra mor Noe, covering about 125 square miles, and formerly belonging to the Luckimpore District, but now forming part of the Durrung District, in which the privilege of collecting rubber from the 1st April 1868 to the 31st of March 1869 was sold for Rupees 1,300, under the same conditions as it was sold in the Government forests between the Bor Nuddee and the Moora Dhunseeree Nuddee.

"Chydooar Forests."

In the Chydooar, Rubber trees are only found in the forest along and immediately at the foot of the hills, and even there, although not felled, they have been almost completely exhausted, so that the rubber purchased here during the past year, which amounted to about 1,500 maunds, came chiefly out of the hills, where it is being collected by the Duphola Tribe. The latter state that the Rubber tree is found for about two days' journey into the hills, after which it disappears, which is much the same in all the outer hills right along the Himalayas.

The rubber in the Durrung District was, as before said, collected, or more correctly speaking, purchased by some person or persons, who either paid for this monopoly, or received it free, under the condition that they would adopt and adhere to certain m sures of guarding against the loss of trees through injury; and if these measures were judiciously carried out, or enforced by men who had had some knowledge of the requirements of the plants, some good might have arisen from those conditions having been inserted into the pottahs: but, as six months' tapping every year are quite sufficient to kill the tree, if advantage was gained by doing so, it is evident that such a length of time is more than sufficient to exhaust the trees to the utmost extent, and more so than is consistent with the interests of the population of a country, who were favored with the source of such a valuable commodity as the caoutchouc.

"How Rubber was hitherto procured, and under what conditions."

Furthermore, as the trees when planted could not have grown up unless some clearance for the admission of air and light had been made and kept open, and as in the few instances, when trees were planted, it was done where it suited the planters, but not the Rubber tree,

the good intentions of the framer of these conditions are entirely without results at present; and so far from trees not having been injured, they have been recklessly destroyed, as stated above, or exhausted to such an extent, that unless the time of collecting is much more limited, and some plantations are started to provide for future supplies, there will be no more rubber procurable from these forests a few years hence, and the Rubber tree will gradually disappear and that valuable commodity be lost to the public, and the revenue derived therefrom to Government.

"Measures of protection of the Rubber forests."

Since the rubber, if well manufactured is equal, if not better than the best similar substances yielded by Castilloa and imported from Mexico, or that obtained from Siphonia Brasiliensis and S. elastica from Brazil, and far superior to the caoutchouc imported from the west coast of Africa, it should be worth while protecting and planting the tree, and endeavouring to induce the manufacturers to produce a quality superior to what they have done of late.

Limitation of time for tapping the Rubber tree.

The chief and the only measure of protection of the Rubber tree is that of limiting the time for tapping to a sufficiently short period, so as to prevent it being overdone, as the export of rubber can be controlled and checked to a great extent; whilst it is almost impossible to check the tapping of the trees themselves in forests so extensive and dense, in fact, in most parts rendered impenetrable by "Calameal," "S. milax," and other climbers, "Pandanus," tree ferns, and other dense scrub surrounding the intervening swamps, so as to permit entrance only by following the elephants and rhinoceros' paths.

The localities where the India Rubber tree grows best, and produces most, are far from any habitations, and more inaccessible than the rest of the forest.

Under these circumstances, the only apparent chance of checking the overtapping of the trees is to divide districts into three or more divisions and permit the working of them by rotation only.

The present exhausted state of the trees, and frequent and careful enquiry from people who engaged in the collecting of rubber, has convinced me that the tree should not be tapped oftener than every third year, and then this should be only done during the three months, January, February, and March, as suiting the operation of tapping, and being at the same time convenient to the gatherers, as not interfering with their agricultural occupations.

Thus the Durrung District might with advantage be divided into three mehals, as follows: first, all forests west of the Bhorolee River; second, the Nowdoour forests; third, the Chydoour forests.

Such an arrangement could not fail to prove beneficial to the trees and secure a permanent supply of rubber, which, I presume, is the main object to be obtained; and as there is no doubt that half of the rubber at present exported, if not more, comes from the hills beyond British territory, these precautions would influence also the independent hill tribes, and prevent them overtapping the trees in their territory, if they could not find sale for it.

There is nothing to prevent these measures being carried out effectively by forest officers, especially if supported in starting by the Civil Authorities, who, through their Mouzahdars, could make this known very rapidly to the people in the District, who, beyond doubt, would soon comprehend the advantage accruing to themselves by the adoption of such a measure.

The felling of Rubber trees would have to be prohibited, and the pottah-holder held responsible for any tree found felled in the division for which he holds the lease.

The revenue realized at present would, of course, be considerably reduced for the next five years, which, however, would be equalized during the succeeding five years, whilst the trees would remain in good health.

If the present system is continued, I am convinced that in less than ten years no revenue will be realized at all from this source.

It may prove necessary, after more experience is gained, to limit still further the operations, but for a first measure I think it best to restrict the tapping to three months. Every third year is sufficient to guard against the trees being exterminated, which they would certainly be if tapping three or four times in the year was continued, as at present.

As the monopoly of purchasing the rubber has been established already, the only people to be watched would be the native shop-keepers in the bazars, to prevent them purchasing during the period the Division in which they trade is kept closed.

This object would to a great extent be attained by giving leases not for one year only, but for three or six years, which would induce the pottah-holder himself to take care of his property, and is desirable for other reasons to be noticed hereafter.

"Improvements of the forests by plantation."

The improvements of the forests, as regards the Rubber trees in them, can only be effected by planting trees in situations where they are likely to produce the largest possible quantity of rubber; and secondly where young trees can be under control.

The first object is to be attained by planting in the most moist localities, which have proved suitable for producing the rubber easily and abundantly by the tree having been placed there in course of the natural distributions of plants, which is invariably the best guide in selections of this kind; and in the Durrung District especially only the forests at the foot of the hills are suited for such operations, and not the vicinity of stations and high roads where Rubber trees have been planted hitherto.

West of the Bhorolee River, the forests between the Deemajang and the Rootah Nuddees would be well adapted; and east of the Bhorolee River, the immediate neighbourhood of a long line of earth-work or stockade, known as the "Duphalaghur," and thrown up by the Duphala people in former ages, and now perfectly overgrown with forest running from the Bhorolee River east in a continual line for about 216 miles right along the foot of the Himalayas to the Diphoo Nuddee, through the extensive forests of the Nowdooar and Chydooar, would be equally well adapted for this purpose.

The planting of Rubber trees in these forests could best be carried on by opening out lines about 15 feet in width and planting the young Rubber trees alternately on either side of the line at about 100 feet apart. If a continual line of this kind was opened out along the foot of the hills, not only could the young trees be easily overlooked, but such a line would also greatly facilitate forest conservancy measures in general, and the removal of timber and canoes from the forest to river banks, &c., over a large extent of country, without a heavy expenditure.

The propagation of the Rubber tree is the easiest imaginable, as every branch put in the ground will make roots and grow rapidly into a tree, if light and air are admitted to the spot by slight clearing or cutting down of the scrub covering it. This will render it an operation possible for the simplest mind to carry out, which might otherwise be unable to perform manipulations of a more difficult nature. Stock plants and nurseries might be kept up at very trifling expense near inspection huts, and from these vacancies filled, up or planting operations extended, as deemed necessary.

The small proportion of useful timber trees in the forest, which is not more than 20 per cent. in the best parts of it, the want of water carriage for timber from many of the forests, and the absence of local labor, where the inferiority of the timber prohibits the importing of labor, are also important facts to render the planting of the Rubber tree desirable.

Assuming that a tree reaches its full size at fifty years without tapping, and would after that yield every third year one maund of rubber, which would be collected, manufactured, and delivered in Calcutta at Rupees 15 per maund, and should realize the present price of good rubber, *viz.*, Rupees 35 per maund, it would leave a net profit of Rupees 20 per tree every third year.

Besides this, one maund of lac may be reckoned on from every tree per year, which, if collected at its present rate, could be delivered in Calcutta at Rupees 10 per maund, whilst it fetches 15 to 20 Rupees per maund there now, which is a clear profit of Rupees 5 at least per tree yearly.

All these figures are the very lowest, and the tapping the most cautious; still if the tree planted lives a second fifty years, which it is sure to exceed, it produces a clear profit of Rupees 320 for rubber and Rupees 250 for lac, which is more than any two timber trees of fifty years each, which might be grown in that time, could equal.

At present there are two kinds of rubber manufactured by the natives : one in irregular-shaped solid lumps or loaves, and about 16 to 20 ounces in weight; and the second kind in round balls, consisting of small particles of rubber, tied together with thin strips of it into balls weighing about 12 to 16 ounces each.

"The yield of the Rubber forests."

Of these two kinds about 2,500 maunds are brought yearly into the Mungledye Bazar, and I estimate an equal quantity into the Tezpore Bazar, although nothing accurate could be ascertained in the latter, as several gatherers had lately been punished for tapping trees against the order of Government, by which the collecting of rubber had been prohibited since December 1864.

In the Chydooar about 1,500 maunds were, as before stated, collected during the last year.

The first or the loaf kinds is collected from the lower parts of the stem and the roots, where incisions are made about 3 to 6 inches long and 1 to 2 inches broad and 1 to 2 feet apart, in a slanting manner, so that the juice which flows out runs to the lower point of the cut, where a leaf is doubled up in funnel shape and fastened either by a small wooden peg or partly inserted into the ground to receive the juice.

This, if a sufficient quantity has been gathered to make one of the above loaves, is boiled in one of the cooking utensils used by the gatherers, which is first partly filled with water, and as soon as this gets hot the juice is poured into it and stirred round until it gets sufficiently firm to be carried about without being clammy or sticking together.

The second kind of rubber is obtained from the upper trunk and branches of the trees, where small incisions are made, and the juice that runs out is allowed to become firm, adhering to the cut or to the bark of the branch near the incision, from which it is gathered as soon as it is sufficiently firm and tied together into the round balls which are exported.

This kind is occasionally brought loose to the market, without being tied together into balls, which renders it, however, less convenient for carrying.

The Kyas in the Mungledye Bazar state that the latter kind formerly fetched the highest price in Calcutta, but at present the loaf kind is preferred and paid higher for.

Both kinds are very carelessly collected, and become either intentionally or accidentally mixed with sand, small stones, chips of wood, &c., which has induced the Kyas in the bazar to pay highest for the cleanest and lightest rubber.

At present the rubber is being kept back by the Kyas, as it does not realize good prices in Calcutta, which, however, must be rather ascribed to the inferiority of the rubber than the overstocking of the market.

The price paid for both kinds of rubber varies from Rupees 8 to 12 at present, which low price, however, is paid by way of barter, as the men who purchase the rubber first buy the Eudi, or Eri, silk at Rupees 8 to 12 per piece, and afterwards exchange this with the "Duphalas" for a maund of rubber.

The rubber bought from the Kacharies is exchanged in the same way for other articles, such as cloth, salt, opium, knives, or money, as it may suit the seller.

The price this rubber fetches in Calcutta varies from Rupees 20 to 40 per maund; but if care was bestowed on the manufacture, it would beyond doubt fetch much higher prices.

The process of manufacture of the good rubber exported by Messrs. Martin, Ritchie and Company, of Tezpore, was always kept a secret during the time they held the pottah; but as three different persons, who were employed by them in separate factories, gave me the same account of it, I presume it to be a correct one, and describe it here, as everything depends on the manufacture, and rubber of superior quality, well prepared, realizes four times as much as the carelessly collected rubber exported at present from Assàm: and a knowledge of it may prove even of benefit in other parts of the world, as for instance, the west coast of Africa, where large quantities of rubber are procured in Corisco Bay and the Gaboon River by English traders, which rubber realizes a comparatively low price, because nothing of the manufacture is known to the gatherers or purchasers either.

The above firm bought the rubber only in its fluid state from the people who tapped the trees, and who either carried it in earthenware pots, or cane baskets made in shape of the former and lined with a coating of rubber, in which the juice is said to keep fluid for about a month.

Rubber in this state was first purchased at Rupee 1-8 per maund, but soon rose to Rupees 5 for the best or thickest procured from the roots, and Rupees 4 for the next best procured from the lower part of the stem, and Rupees 3 for the worst, supposed to come from the upper branches of the tree, and to have been mixed with the juice of other species of figs and water.

This was placed in large wooden boxes or bins, measuring about 6 feet each way, and partly filled with water. These are sunk into the ground with an arrangement for letting off the water and juice, which separates from the rubber after a day or two, together with earth, sand and small stones which may be in the juice when put into the bins. After four or five days, when turning a dark colour, and the rubber separated from the water rises to the top, but is still fluid, it is put into large iron pans of 4 to 6 feet in diameter and 2 feet to 2 feet 6 inches in depth.

The latter are first partly filled with water, about double the quantity of the rubber to be boiled, after which the boiling is commenced with slow fires, whilst the juice is being stirred round.

When the rubber collects together in one mass, and the water loses its milky white appearance and clears up, it is considered ready for lifting out with iron forks, and is placed in presses of about 18 inches long and 12 inches broad by 3 inches high, in which all watery matter is pressed out, and the rubber, shaped into compact slabs. After this first pressing for about an hour or two, it is cut into two pieces of equal size, which are put into smaller and lighter presses, in which they remain one or two days until smooth and somewhat firmer, after which the pieces are boiled a second time for about one-quarter of an hour, and this finishes the rubber. These pieces are then dried in the sun, and afterwards washed with a thin coating of lime and stored on shelves in a dry hut until packed and despatched.

As everything depends on the manufacture of the rubber, an effort should be made to induce the pottah-holders to make a better kind; and this might be made a condition in their future leases; and as the pottah-holder in the Chydooar is anxious to do so if he can get a lease for for a longer period than one year, the inclination deserves the greatest encouragement.

"Improvements in the manufacture necessary."
"Longer leases advisable."

The simple method by which the rubber is prepared in the province of "Para" in Brazil, *viz.*, by pouring the juice upon moulds and drying it in the smoke of slow fires, is unknown here, and I think well worth introducing, unless some better method can be ascertained from the manufacturers in England.

As the quality of the rubber is of such importance, and no doubt the revenue derived from this source would much increase if it was only exported of the best quality, I would suggest that the samples now sent should be forwarded to the Reporter on Indian Products, India Office, London, with a view of ascertaining the value of this rubber compared with that from other parts of the world, and by what measures the rubber at present manufactured in Assam could be improved.

It is impossible to form any correct estimate of the number of trees likely to exist, but that they must be very abundant is evident from the large revenue realized, as shewn below:—

Forest Revenue received on account of Caoutchouc from 1861-62 *to* 1867-68, *in the Provinces of Assam.*

Names of Districts.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.	Grand Total.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds	Mds.
Durrung ..	.....	.....	1,525	1,012	....	....	....	2,537
Luckimpore..	.....	.....	12,142	6,583	16,030	2,950	2,000	39,705
Nowgong ..	8	8	829-3	5	8	243	3,600	4,701-3
Total ..	8	8	14,496-3	7,600	16,038	3,193	5,600	46,943-3

The importance of the produce will be apparent from the fact that in 1863 not less than 65,649 cwt. of caoutchouc were imported into Great Britain.

G. Mann,
Assistant Conservator of Forests,
on Special Duty to Assam.

The Forests in the Luckimpore District (north bank of the Brahmapootra only.)

These forests are very extensive; in fact, the whole District consists more or less of forest land, but sâl forests are unknown.

The Luckimpore District.

In addition to being timber and caoutchouc producing forests, the trees on which the silkworms are raised are very common in a tract of country which apparently has been under cultivation in former ages, and on which especially the soom tree (Machilus Odorotissimus) has now become very common.

These forests, no doubt, originated in plantations started near villages, but have now become pure forests of considerable extent.

The timber and caoutchouc producing forests extend over about 942 square miles, whilst the tract of country in which the soom forests are found includes about 450 square miles.

They may be enumerated as follows :—

The timber and caoutchouc forests.

1. A belt of timber and caoutchouc forests along the foot of the Himalayas for seventy-eight miles from the Mooramor Noe to the Boree Sootee, and varying from eight to ten miles in width, being broadest in the neighbourhood of the Shoobun Sheeree River.

These forests are almost exactly of the same description as those in the Durrung district, and contain the same kinds of timber trees nearly in the same proportion ; but on the whole are somewhat lower and more swampy, in consequence of which the proportion of useful timber trees is rather less, and the caoutchouc canes and useless scrub more abundant.

Timber from these forests can be removed by the "Deikrung," "Ranga," "Shoobun Sheeree," "Dhol" and "Sciree" nuddees.

2. Those isolated forests which are superior to the general stamp of forests, and are situated in the same part of the country as the soom forests.

They take their names generally from the streams or villages to which they are contiguous, and are the following :—

No. 1.—The "*Goggildoolia Forest*," of about fifty square miles, and lying between the Goggildoolia village and the Shoobun Sheeree River, and on the right of the latter river.

No. 2.—The "*Googaahmook Forest*," of about twenty-five square miles, and situated on the left bank of the Shoobun Sheeree nuddee, and in the neighbourhood of the junction of the Googah and the Shoobun Sheeree Rivers.

No. 3.—The "*Ranee Beel Forest*," of about twenty-five square miles, surrounding the Ranee Beel and the Moora Dhol nuddee.

No. 4.—The "*Rytong Forest*," of about sixty square miles, lying on the right bank of the Dhol nuddee, and between this and the Koorah nuddee.

No. 5.—The "*Bolacatta Forest*," of about eighty square miles, and situated on the left bank of the Dhol nuddee, and between this and the Seeree nuddee.

In these forests the better kinds of timber trees are the same, but not so large as those along the foot of the hills, which can easily be accounted for by their proximity to the Brahmapootra, and the easy way of removing canoes from them.

The latter have always been, and are still cut in these forests by the natives, and the easy access to them is a great advantage over similar forests in this and the Durrung district.

In the Bolacatta forest the caoutchouc tree is very abundant, and finer trees were seen in this than in any other forests in Assam.

The various species of cane are also very abundant, and deserving of every care and attention being paid to their conservancy.

The soom forests.

3. The soom forests, which consist almost exclusively of soom trees, are distributed in patches of all sizes from one acre to one or more square miles over a tract of country of about 450 square miles, which lies south of the belt of forests first-named, or between this and the Brahmapootra.

They form a perfect labyrinth of small forest blocks, of the extent of which it is impossible to judge without surveying, as they are interrupted constantly by open fields, which seem to have been formerly rice cultivations, and have now become excellent grazing grounds.

This tract of country extends for about fifty-seven miles from the Mooramor Noe, or Durrung district to the Boree Sootee, opposite Debrooghur.

Scattered simul or himool in the neighbourhood of the Brahmapootra.

On the banks of the Brahmapootra, and the various sootees or creeks branching from the Erahmapootra, and returning to it, simul is very abundant, and has, from favorable spots, been removed by the Meerees to the Dehing works saw mill, where this and several other soft woods are used in large quantities for the manufacture of tea boxes.

These enormous tracts, consisting of river sand, with a thin layer of mould on its surface, are chiefly covered with high grasses, amongst which the simul or himool (Bombax Malabaricum) is abundant. These tracts cannot be called forests, and their reservation is not advisable, as about a quarter of the whole country consists of them; but the himool should be included in the reserved trees, and the indiscriminate felling of it restricted, as the use it is put to at the Dehing saw mill is sufficient proof of its utility.

A few sissoo trees exist on the banks of the Booree Sootee; but they are so scarce that the reserving of the tracts is not advisable on their account.

With the exception of the timber supplied to the Dehing saw mill, no timber has been exported from this part of Luckimpore, but inferior canoes and excellent oars have always been fetched from these forests. The latter are chiefly cut out of the bola tree (Marlea Sp.)

Luckimpore forests more accessible than the Durrung forests.

As before stated, the forests in the Luckimpore district are more accessible than those in the Durrung district on account of their being either near large streams fit for floating timber, or intersected by small streams, by which timber can be brought out at moderate expense.

In some parts of the forests water rises in the rains 4 and 5 feet, so that especially those kinds of timber which grow in the lower swampy locations can be floated from the spot where they have grown to the Brahamapootra.

The population being a very scattered one, labor is comparatively scarce; but as the Meerees, a wandering agricultural race live in considerable numbers in the district, and are inclined to bring timber into depôts by contract, there will be less difficulty of working the forests here than in the Durrung district.

Natural reproduction of timber trees.

Natural reproduction of timber trees can no more be depended on here than in the Durrung, nether is improvement of these forests in their present condition advisable.

Plantations.

Plantations, however, could be started with great advantage on the banks of the following rivers, and their reservation to a width of 1,000 yards would be advisable wherever they are suited for forest plantations, and such a course would not interfere with any existing rights, or inflict hardship on the people who may occupy these lands.

1.	The bank of the		Dekrung	Nuddee.
2.	Ditto	ditto	Ranga	ditto.
3.	Ditto	ditto	Shoobun Sheeree	ditto.
4.	Ditto	ditto	Dhol	ditto.
5.	Ditto	ditto	Seeree	ditto.
6.	Ditto	ditto	Kherkotea	ditto.
7.	Ditto	ditto	Boree Sootee	ditto.

But few countries could offer greater facilities for plantations, and the renewal of timber growing in them, than this part of the Luckimpore district, especially for sissoo plantations, for which almost unlimited areas may be found here. Since there is a great demand for this

timber, since its growth is rapid, and its propagation the easiest imaginable, the starting of extensive plantations of sissoo would be most desirable, as it could not fail to become a great source of revenue to the State, and supply the increasing demands of the public.

Want of experience prevents estimates of the cost of getting up sissoo plantations in any but the ordinary way, but it is most probable that a much simpler method, *viz.*, the sowing broadcast, or in lines, of sissoo seed on the extensive grass fields in the neighhourhood of the Brahmapootra, and the banks of the above river, would be practicable immediately after the spring fires have cleared them; neither is it unlikely that the trees will be able to grow up into perfect timber trees without any subsequent clearing, and with very little pruning.

The cultivations of the Meerees, which are always abundant after three or four years, might also be made use of for this and other plantations, which would be another advantage in favor of plantations in this district, especially if Meerees could be induced to sow, or plant the timber trees at once amongst their own crops, which is not unlikely, especially if their small capitation tax of Rupees 3 per head was not levied from persons who engage in doing so.

Forest land cultivation.

In a district of which the permanently cultivated lands form only a small portion, forest land cultivations must naturally be extensive, and could not be discontinued without inflicting hardship on a great part of the community; but they should be guided into certain channels, and kept on such forest land which from the inferior forest on it, or from its position, is less favorable for arboriculture.

Fires.

The fires are chiefly confined to the neighbourhood of the Brahmapootra, and do quite as much good as harm to those forests' products which exist on such ground at present, and consist of scattered himool trees only.

The felling of timber.

The felling of timber for sale has been interdicted since December 1864, but still thousands of logs have been removed to the Dehing Saw mills from this part of Luckimpore, and even from the immediate neighbourhood of Debrooghur, as well as from the Seebsaugor district.

The collecting of caoutchouc.

The privilege of collecting, or rather of purchasing the caoutchouc collected in these forests is sold annually to the highest bidder under the same restriction as in the Durrung ditrict; but as these restrictions are not sufficient to prevent the destruction and overtapping of the trees, the purchasers of these Mehals have no control over the people who collect it, and the planting of trees without subsequent care is useless. The caoutchouc trees here, as in the Durrung district, are almost completely exhausted.

The soom forests in Durrung district.

The soom forests are most valuable, and the leaves of the soom tree constitute one of the most important forest products in the Luckimpore district.

The scanty population make use of but a small portion of these forests at present; but still during the current year 6,621 beegahs were leased to the inhabitants of north Luckimpore, and those people who come from the south side of the Brahmapootra to rear their silkworms in these forests, and revenue to the amount of Rupees 3,313 was realized from them.

Luckimpore is the chief district for the rearing of the Mooga silk-worm, which thrives better on the soom tree than on any other, and although the latter is cultivated all through Assam, it seems to have found the climate of this district most congenial, and has spread over a large area.

Whilst in other parts of Assam the Mooga silk-worms are chiefly bred for sale, this is the district in which they are reared in large quantities for the sake of the silk, which is the favorite clothing of the natives.

These forests are leased at the usual rates of high or dry cultivation lands, *viz.*, 18 Rupees per beegah, and the rearing of silk-worms is considered one of the most profitable occupations by the natives, since they generally realize from Rupees 50 to 80 per poora or four beegahs, and failures do not occur oftener on an average than every ten years.

It is reared twice in the year, once in April and May, for the sake of the silk, and once in October and November, for which rearing the cocoons are fetched from Lower Assam, and the worms are bred to supply the stock for the next April and May crop.

The timber and caoutchouc forests in the Luckimpore district might be kept as reserve or open forests, as, in either case, they can be sufficiently controlled, whilst the soom forests should be strictly reserved to prevent their being cleared for cultivations. They deserve some extra care being bestowed on them, and from their compact growth can be closed against any other use but the rearing of silk-worms, without interfering with the other cultivations of the people, whilst their control can be made most effectual, without heavy expenditure.

The ensuring of the safety of the forests is desirable, in case the silk trade in this part of Luckimpore should regain its former importance.

(Sd.) G. MANN,
Asst. Conservator of Forests,
on Special duty to Assam.

Forests on the South side of Brahmapootra not inspected.

Forests on the south side of the Brahmapootra not inspected.

ALTHOUGH inspection of forests was confined to the north bank of the Brahmapootra, sufficient was learned of the forests on the south side of the river to show that they are most valuable and extensive; and although they have shared to a great extent the fate of all valuable forests, such as sâl, they are still deserving of the greatest care. Their conservancy should not be delayed until they have been inspected, but their control be made at once as efficient as possible.

Sâl forests.

The most valuable are the sâl forests, in which the only mature sâl timber in the Province is left.

If we take into consideration that all the sâl forests in the Eastern Dooars in the Gowalpara district have been completely worked out; that in the Western Dooars the supply to be had is very limited; that in the Darjeeling district mature sâl is only left on the hills; and, moreover, if the enormous extent of the spoliation and waste formerly carried on be considered, the strictest conservancy of all sâl forests becomes imperative; especially so since this timber is becoming also scarce in other Presidencies and in the neighbouring Foreign States, such as Nepaul.

Since sâl forests are always pure or nearly so, and can be distinguished from other forests at several miles distance, no disputes can arise, or the control over them be difficult, until such time as these forests can be defined by proper boundaries, which latter must necessarily be a matter of time, and could be proceeded with as the general improvements of the forests were being carried on.

The sâl forests on the south side of the Brahmapootra, which should be reserved, are the following :—

Kamroop District.

1. Raneedooar	...	...	Sâl forest.
2. Chay-gaondooar	...	...	"
3. Bokodooar	...	...	"
4. Bangaon	...	...	"
5. Bagare	...	...	"
6. Pantan	...	...	"
7. Bordooar	...	...	"
8. Bholagaon	...	...	"
9. Mawrapoor	...	...	"
10. Bchtollah	...	...	"
11. Doomreah	...	...	"
12. Panbaree	...	...	"

Nowgong District.

1. Amtollah	...	...	Sâl forest.
2. Digoo	...	...	"
3. Hynngkopely	...	...	"
4. Koomrakatta	...	...	"
5. Katalgoree	...	...	"
6. Kolealolla	...	...	"
7. Nejoree	...	...	"
8. Mesva	...	...	"
9. Nowbhanga	...	...	"
10. Gallana	...	...	"
11. Nelly	...	...	"
12. Gobha	...	...	"
13. Khola	...	...	"
14. Kangkhang	...	...	"
15. Gathgar	...	...	"
16. Lootmcee	...	...	"
17. Amoree	...	...	"
18. Singmaree	...	...	"
19. Bamonedooar	...	...	"
20. Harlockpurbut	...	...	"
21. Geldhurrungpoora	...	...	"
22. Dikhoroo	...	...	"
23. Joongthong	...	...	"
24. Nazerhajee	...	...	"

Seebsaugor District.

In the Seebsaugor district comparatively little sâl is found which grows on the outer hills or northern slopes of the Patkye Mountains, and on the plains along the foot of these hills chiefly in the neighbourhood of Gelikee.

Mixed forests on the banks of the Booree Dehing.

Besides the sâl forests on the south side of the river Brahmapootra, the mixed forests on both banks of the Boree Dehing nuddee should be placed under efficient control, and the indiscriminate felling in them prohibited, since, as before stated, thousands of logs were supplied from them and other forests to the Dehing saw mill, whilst the felling of timber was supposed to be prohibited.

The Dehing saw mill.

The Dehing saw mill works constantly on a large scale with a twenty-five horse power engine, but only for local requirements.

Timber Depôt proposed.

Inferior timber is supplied by the natives in any quantity, but the better kinds of timber, especially in great lengths, are difficult to be got, and a large timber depôt adjoining the saw mill, in which the Forest Department could stack timber of all kinds and all sizes, would, no doubt, prove of general benefit to the province, if not beyond it, since the Public Works Department and private consumer could choose their timber in the depôt, or let the manager of the mill do so, and have it sawn up into any scantlings required.

At such a depôt all timber brought to the mill from other forests than those on the banks of the Dehing could also be checked and passed.

Reserved timber and other trees.

The better kinds of timber growing in Assam, and trees which should be reserved for other uses than timber supply, are the following :—

First class Reserved Timber Trees.

Number.	Native Names.	Botanical Names.
1	Hal	Shorea Robusta.
2	Sisso	Dalbergia Sissoo.
3	Sām	Artocarpus Chaplasha.
4	Kuthal	Artocarpus Integrifolia.
5	Poma	Cedrela Toona.
6	Tita Sappa	Michelia Champaca.
7	Nahor	Messua Ferea.
8	Ajhar	Lagerstremia reginae.
9	Gunserai	Camphora Glandulifera.
10	Bun Jamoo	Engenia Mangifolia.
11	Bur Jamoo	Engenia Jambolana.
12	Uriam	Andrachne Trifoliata.
13	Gomararee	Gmelina Arborea.
14	Bola	Marlea Sp.
15	Makreeah	Gordonia Mollis.

Second Class Reserved Timber Trees.

Number.	Native Names.	Botanical Names.
1	Koir	Acacia Catechu.
2	Kowi	Albizzia Adoratissima.
3	Phool Sappa	Michelia Oblonga.
4	Phool Hingoree	Echinocarpus Tiliaceus.
5	Bur Hingoree	Castanopsis Tribuloicdes.
6	Hilika	Terminalia Citrina.
7	Amaree	Terminalia Tomentosa.
8	Sonaree	Cassia Fistula.
9	Boga Poma	Chikrapia Tabularis.
10	Parellee	Bignomia Chelonoides.
11	Raghoo	Nanclea Cadamba.
12	Gohorah	Vitex Pubescens.
13	Amlookee	Emblica Officinalis.
14	Booal	Ehretia Serrata.
15	Borthekra	Garcinia Pedunculata.
16	Bun ām	Mangifera Sylvatica.
17	Ghoree ām	Mangifera Indica.
18	Himool	Bombax Malabaricum.

Other useful Forest Trees which should be reserved.

Number.	Native Name.	Botanical Names.	Use of the Trees.
1	Attah Bur ...	Ficus Elastica ...	The caoutchouc tree.
2	Pakree	Ficus Cordifolia ...	The lac insect is reared on this.
3	Joree Pakree ...	Ficus Camosa ...	Ditto.
4	Ooctal	Sterculia Villosa ...	The bark is used for rope manufacture.
5	Buhot	Artocarpus Lacoocha ...	The roots and bark are chewed.
6	Mazankori ...	Machilus Sp. ...	Silk-worm plants.
7	Noanee	Morus Indica ...	
8	Boomsotee ...	Syplocos Grandifiora ...	
9	Soom	Machilus Odorotissimus	
10	Soaloo	Tetranthera Monopetala	
11	Kotoloah ...	Cylicodaphne Nitida ...	
12	Pattee Chundah ...	Cinamonum Obtusifolium	

Bamboos and canes.

Besides the above trees all bamboos and canes should be strictly reserved.

The Nambor Forests.

The Forest Department has assumed charge of the Nambor forests in the district of the Naga Hills.

This forest has been reserved for many years past, and is known to contain the finest Nahor timber in the Province.

Loss of elephants.

The work of inspection was commenced with four elephants, of which two were newly caught and untrained, and much anxiety and loss of time were experienced in consequence.

One of the newly caught elephants was drowned in the attempt to cross the Brahmapootra at Gowhatty, and the second one died in April on the banks of the Dhol Nuddee, after going during the day over ground unusually severe, but only for a short distance, not more than eight miles.

The coolies employed were Nepalese and Meechies, who kept in remarkably good health after the first month was got through. The former class of people might be employed with advantage for working out timber from forests situated on hills too steep for elephants, in case the local hill tribes should be found unwilling to do so themselves, though this, as far as could be learned, is not likely to be the case.

Coolies employed.

The employment of imported labor should not be attempted until all efforts to procure local labor have failed.

Employment of imported labor.

The "Ahoms" or aborigines of the plains of Assam can never be reckoned on for regular timber work of any description.

The aborigines of Assam.

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special Duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Luckimpore District.*

Item of Revenue.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
Forests.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
a. Sale of, or duty on timber and trees for cutting timber ...	...	...	...	...	19	1	...	...
b. Caoutchouc ...	...	..	...	12,142	6,583	16,080	2,950	2,000
c. All other forest produce ...	...	...	...	...	...	...	...	...
d. License to catch elephants ...	...	...	...	...	440	100	60	100

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Luckimpore District.*

A.—Sale of, or duty on timber and fees for cutting timber.

Names of Mouzahs.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Dhokwa Khonah	...	...	...	...	1	...
Harhee	...	...	...	...	1	1
Gohini Goa	...	...	...	...	6	...
Dighola Goa	...	...	...	...	11	...
Total ...	...	...	...	...	19	1

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Seebsaugor District.*

Item of Revenue.	1860-61.	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
Forest.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
a. Sale of, or duty on timber and fees for cutting timber ...	...	...	...	...	...	...	...	...
b. Caoutchouc ...	...	...	...	...	...	...	...	...
c. All other forest produce ...	...	...	...	...	...	...	...	...
d. License to catch elephants ..	...	...	...	...	...	...	1,700	...

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special duty to Assam.

Forest Revenue collected from 1860-61 *to* 1867-68 *in the Nowgong District*

Items of Revenue.	1860-61.	1861-62.			1862-63.			1863-64.			1864-65.	1865-66.	1866-67.	1867-68.
Forests.	Rs.	Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.	Rs.	Rs.	Rs.	Rs.
a. Sale of, or duty on timber and fees for cutting timber	...	141	1	6	20	2	0	784	11	6	202	...	...	2
b. Caoutchouc ...	...	8	0	0	8	0	0	82	9	3	5	8	243	3,600
c. All other forest produce ...	...	...			...			525	0	0	...	...	...	...
d. License to catch elephants..	...	...			...			...			380	300	340	520

(Sd.) G. MANN,
Assistant Conservator of Forests,
on Special Duty to Assam.

FOREST RULES, BRITISH SIKHIM.

I. THE administration of the forests will be vested in the following Officers :—

1*st.*—The Conservator of Forests.

2*nd.*—His Assistants.

3*rd.*—Subordinate Forest Officers, *viz.*, Overseers, Darogahs, Jemadars, Duffadars, Forest Watchers, and Peons. It will also be the duty of all police officers to watch over the observance of these rules, and to afford every assistance to the forest officers in the exercise of their duties.

II. Within the limits of the forests, the marking, girdling, lopping, or felling of trees, shrubs, bamboos, or canes, and the removal, or attempted removal of any natural produce of the forests, except with permission of the Conservator, is absolutely prohibited under the penalty of confiscation provided by the Act.

III. Within the limits of the forests, the grazing of cattle, the burning of lime or charcoal, and the lighting of fires, is absolutely prohibited, except with the permission of the Conservator of Forests. Any one found so doing shall be arrested and shall be liable, after conviction before a Magistrate, to a fine not exceeding 50 Rupees, or in default, to imprisonment for a period not exceeding fourteen days.

IV. The arrangements for the sale and cutting of timber in Government forests shall be made by the chief local forest officer, subject to the approval of the Conservator of Forests. No timber trees shall be cut that have not been marked for felling by the Forest Department. Ryots, however, dwelling near a Government forest shall be permitted, by the local forest officer, to remove grass, bamboos, and timber, except sâl, *(Shorea robusta)*, sissoo, *(Dalbergia sissoo)*, kala sissoo *(Dalbergia latifolia)*, chalawnee *(Gordonia* sp.*)* chesnut, oak, and magnolia for building or thatching native dwellings.

V. Cultivation in Government forests of roots and grain of any kind, except in tracts defined by the local forest officer, and on the payment of the rent usually levied from squatters in the district, is prohibited. Any infringement of this rule will be punished, after conviction before a Magistrate, by a fine not exceeding 50 Rupees, and confiscation of the crop, or in default, by imprisonment not exceeding fourteen days.

VI. Timber in the Government forests will be sold as follows :—

1*st*.—In the temperate forests, trees belonging to the following species may be sold to purchasers requiring a small number of trees, and who may fell and remove the timber. No sale shall be considered as concluded, and no timber is to be delivered on account of the same, unless the full amount of the purchase-money has been paid to the forest officer conducting the sale. The sale will hold good for a certain period. Timber not removed from the forests within the time fixed, whether paid for or not, remains the property of Government. Such sales do not require the approval of the Conservator of Forests, but may be concluded by the forest officer in charge of the division. The following rates are fixed at present for each tree of the best class of timber in the temperate forests purchased in the above manner :—

FIRST CLASS RESERVED TIMBER.

Names of Trees.	*Rate per Tree.* Rs.	As.	P.
White Magnolia,—Champ (*Michelia excelsa*)	10	0	0
Red Magnolia,—ditto (*Magnolia Campbellii*)	8	0	0
Chesnut,—Katoos (*Castaneea* sp.)	10	0	0
Oak,—Booke (*Quercus lamellosa*)	8	0	0
Walnut,—Acrote, (*Juglans regia*)	15	0	0

SECOND CLASS RESERVED TIMBER.

Names of Trees.	*Rate per Tree.* Rs.	As.	P.
Oak,—Badjirat (*Quercus* sp.)	6	0	0
Chalawnee (*Gordonia* sp.)	6	0	0
Cherry,—Puddum, (*Cerasus puddum*)	4	0	0
Lali (*Phœbe* sp.)	4	0	0

2nd.—In the sâl forests of British Sikhim, sâl and other reserved timber may be sold according to the above rule to individuals requiring a limited supply at the following rates per tree :—

FIRST CLASS RESERVED TIMBER.

Names of Trees.	*Rate per Tree.* Rs.	As.	P.
Sâl (*Shorea robusta*)	10	0	0
Urjun (*Terminalia* sp)	8	0	0
Sitsal (*Dalbergia latifolia*)	12	0	0
Sissoo (*Dalbergia sissoo*)	8	0	0
Chalawnee, (tropical) *Gordonia Wallichii*	10	0	0

SECOND CLASS RESERVED TIMBER.

Names of Trees.	*Rate per Tree.* Rs.	As.	P.
Acacia elata,—Seet	5	0	0
Acacia catechu,—Khair	4	0	0
Acacia stipulata,—Amluki	5	0	0
Acacia farnesiana,—Guya babula	2	0	0
Bombax malabaricum,—Semul	3	0	0
Bamboos, per 1,000	3	0	0
Gmelina arborea,—Gumbir	5	0	0

[The timber of trees not specified above is termed "unreserved timber."]

3rd.—Parties requiring timber in large quantities either from the temperate or tropical forests may receive permits or licenses to purchase the seasoned timber standing or lying in the forests. This timber will remain the property of Government until the full amount of purchase-money is adjusted. These sales will hold good for a certain period. Timber not brought away within the time fixed, whether paid for or not, will remain the property of Government. Sales of timber under this rule are not to be concluded for a longer period than three years. The sale cannot be concluded without the written sanction of the Conservator of Forests, Lower Provinces, although the Assistant Conservator may conduct the preliminary arrangements for the sale.

VII. Persons permitted to cut timber in Government forests will be required to register in the Office of the Assistant Conservator of Forests, British Sikhim, a specimen or *fac simile* of the brand or mark wherewith their timber shall be marked under the superintendence of the forest officers. A fee of Rupees 10 will be charged for the registration of a mark or brand. The use by private individuals of the Government timber brand, or of any other brand already registered for use in the division, is prohibited, and any person found using a property-mark other than his own, or effacing any property-mark from timber, either in the forests or in transit from them, or from timber floating in a river, before such timber has paid the duty, will be liable, on conviction before a Magistrate, to a fine not exceeding Rupees 500, or in default of payment, to imprisonment for a term not exceeding six months.

VIII. All timber which may be transported by the rivers Teesta, Mahanuddee, Balasun, Meech, and Kunkaie, will be stopped at the stations of the Forest Department, for the purpose of levying fees payable on such timber at rates to be published hereafter. No rafts or timber will be allowed to pass or quit these examining stations until a pass has been given by the officer in charge of the station after payment of such rates.

IX. All drift and unclaimed timber, and all timber found floating in the rivers Teesta, Mahanuddee, Balasun, Meech, and Kunkaie, without a registered brand or mark, will be, confiscated to Government.

X. The following rates of duty will be charged on unreserved timber and miscellaneous produce of Government forests wherever posts are established by forest officers with the sanction of Government for the collection of such duties; or, where the right to levy such duties in specified tracts is leased to farmers, duty will be charged.

Table of Duties leviable on Unreserved Timber and Forest Produce at Posts of the Forest Department.

Articles.	Rates of Duties.								
	Cart-load.			Bullock-load.			Coolie-load.		
	Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.
Timber of unreserved sorts	1	0	0	0	4	0	0	0	6
Lac, catechu, gum, honey, wax	3	0	0	0	12	0	0	2	0
Bamboo, canes (calami), brooms, bark, rope, jungle fruits	1	0	0	0	8	0	0	1	0
Firewood (from unreserved species), grass, bamboo leaves for fodder	0	2	0	0	0	6	0	0	3
Charcoal made in the forests from unreserved species	1	0	0	0	4	0	0	1	0
Lime collected in the forest	2	0	0	0	8	0	0	2	0

When these duties are levied on rivers, the rates will be—

	Rs.	As.	P.
1*st.*—On logs over three feet girth	1	0	0
2*nd.*—On logs under three feet and above one and half feet girth ...	0	4	0
3*rd.*—On rafters, railway sleepers, and other timber of smaller size ...	0	3	0
4*th.*—On bamboo, per 1,000	1	8	0

XI. The Conservator of Forests in granting permission or licenses to contractors or others to cut timber in Government forests, will bind them by such conditions regarding time and route of removal, method of cutting up the timber into logs, sleepers, or scantlings, protection from fire, &c., as he may deem necessary for the prevention of waste, economising the supply of timber, and the safety of the forest. If such conditions are not observed, the timber will be liable to confiscation.

XII. River or road-borne produce passing a post established for the collection of duties under this rule will be exempt from duty if it be shewn that such produce was grown or collected in private forests, or that it was bought from the Forest Department, or has already paid forest duty elsewhere. These exceptions are not applicable to foreign timber or forest produce.

XIII. No forest officer shall engage in any other employment or office whatever other than his duties under these rules, unless expressly authorized to do so in writing by the Conservator of Forests.

XIV. The principal forest officer of the division shall be responsible for the payment monthly into the principal treasury of the district of all money received by him in payment for the timber or forest produce of the division. No forest officer subordinate to the officer in charge of the forests of the division shall be authorized to grant receipts for forest revenue without the countersignature of the principal local forest officer.

XV. Any subordinate forest officer who shall be guilty of any violation of duty or neglect of any rule or regulation or lawful order, made by a competent authority for his guidance in matters connected with guarding the boundaries of the forests, the marking, girding or felling of trees, the marking and passing of timber, the reporting and preventing of offences against the forest rules, or who shall engage without authority in any employment other than his forest duty, or who shall withdraw from the duties of his office without permission, or without having given previous notice for the period of two months, shall be liable, on conviction before a Magistrate, to a penalty not exceeding Rupees 250, or in default of payment, to imprisonment for a term not exceeding three months.

XVI. All contracts, licenses, permissions granted to parties to exercise any privilege, or to do any act in forests under the preceding rules, must contain a condition that infringement of any general rule or special provision will entail forfeiture of such contract, license or permission, and also of any wood or forest produce marked out or gathered, provided it is still within the limits of the forest.

Rules made by the Government of Bengal under Section 3, Act VII. of 1865, for the administration of the Government Forests in the Lower Provinces of Bengal.

SECTION I.

1. These rules shall be in force in those districts of the Lower Provinces to which they may be extended by an order of the Government of Bengal, published in the *Gazette*.

2. On any tract being declared by notification under Section 2, Act VII. of 1865, to be subject to the provisions of that Act, it shall be subject to the authority of the Conservator of Forests under the following rules. Provided that the Government may appoint any person, other than the Conservator of Bengal Forests, to be Conservator of any specified tract.

3. Divisions and sections will be placed under the management of Deputy and Assistant Conservators, as may be determined by the Government of Bengal.

4. The Government forests, as notified under Section 2, Act VII. of 1865, shall be marked on a copy of the Revenue Survey Map of the district, which shall be deposited in the Office of the Commissioner of the Division, and attested by his signature.

5. There will be two classes of forests—"Reserved" and "Open."

SECTION II.

RESERVED FORESTS.

6. The reserved forests shall consist of tracts of forest or waste lands, being absolutely the property of Government, which may be set apart as such by order of Government. The Conservator of Forests and his subordinates shall have entire administration, custody, and control over these forests and their products.

7. Within reserved forests no tree of any kind is to be felled, nor shall any forest produce be removed without general or special authority obtained from the Conservator of Forests.

8. The boundaries of these forests must be clearly marked off by substantial marks where no natural boundaries exist. Should villages be included within these tracts, the boundaries around the village lands must be demarcated in the same manner as the forest, subject to the proviso in Section 2, Act VII. of 1865.

Whenever the Government may resolve to set apart any tract as a reserved forest, the privileges which villagers are to be allowed to enjoy in the matter of providing themselves with firewood and wood for domestic and farming purposes shall be distinctly defined and approved by Government. It shall not be competent to the Conservator, in any way to restrict or modify privileges so allowed, except with the approval of Government.

10. As soon as the notification reserving the forest is published in the *Gazette*, a notification will be published and issued to the villages around, mentioning the boundaries of the tract reserved, warning the villagers against trespass or mischief, and defining the restrictions imposed on them and the privileges allowed to them within the reserved forest under this section. This notification will be issued by the district officer, and a copy will be sent to the forest officer for information. The Conservator will nevertheless be careful to give prompt attention and consideration to any complaints which may subsequently be preferred, to the effect that the restrictions so imposed infringe rights of, or inflict hardship upon, individuals or communities.

11. The Conservator of Forests may prohibit all persons from passing through a reserved forest, except by the authorized roads or paths, of which a list shall be published, drawn up by the Conservator, in conjunction with the chief civil authority.

Section III.

Open Forests.

12. The open forests shall consist of such tracts of forest or waste land notified under Section 2, Act VII. of 1865, as may not, by special notification, be included in the reserved forests. In these tracts the authority of the Forest Department shall extend only to the protection of such reserved trees as may from time to time be notified with the approval of the local Government.

13. Within the limits of open forests, and subject to the proviso in Section 2, Act VII. of 1865, no person, without the permission of the forest officer, may mark, cut, girdle, or fell, or in any way injure, any tree of the kinds which may be reserved as aforesaid.

14. Until the Government forests, to which these rules shall be applicable in any district, are settled and defined under Section 2 of the Act, no lands in the district which are covered with trees, brushwood, or jungle, and after the forests shall have been defined, no such land in the open forests, shall be sold, nor shall grants or leases in such lands be given, except under the orders of the Commissioner, who should, before passing final orders, communicate with the Forest Department; and in case of difference of opinion between him and that department, refer the question to the Government.

15. In addition to the reservation of the timber trees of t may be notified as reserved under Rule 12 above, it shall be competent to the Forests and his assistants to prohibit the felling, cutting, or otherwise using trees of other kinds which they may have marked or girdled within the open forests.

16. No other restrictions shall be imposed by the Forest Department in regard to the open forests, except after the publication of notifications, with the approval of the Government.

17. Should the Conservator think it desirable to impose any further restrictions than those above specified in any open forest, he shall, in the first place, communicate his proposals to the Commissioner of the Division, who shall give his opinion on the subject. Before approving of any such proposals, it will be the duty of the Commissioner of the Division to satisfy himself that the proposed restrictions will infringe no rights or privileges which should be preserved, and to define precisely any privileges which should be kept intact. On receipt of the proposals as agreed upon between the Conservator and Commissioner, the Government will sanction the issue of notifications imposing such restrictions as it may see fit.

Section IV.

Use of Streams and marking Hammers.

18. A list of streams in each district, which must be kept open for the passage of timber, will be made by the Forest Department in conjunction with the civil officers of the district, and be published for general information; and it will be the duty of the civil officers to see that these are kept open.

19. No timber felled in the Government reserved forests, found adrift or stranded in the rivers and creeks of any district to which these rules may be extended, shall be marked until disposed of by the Forest Department, neither shall any mark on it be defaced. It shall not be converted or cut into pieces, neither shall it be removed or disposed of in any way without the orders of the forest officer, except on an order or decree by a competent court.

20. All timber disposed of by the Forest Department must be stamped by the Forest Department with such marks as the Conservator may direct.

21. All brands or marking hammers used in the marking of timber must be registered in the forest office of the division in which they are to be used. A fee of Rupees 10 must be paid for every mark registered, and a certificate will be granted on payment of fee.

22. The use by private persons of any Government timber mark, or of any other timber brand or mark already registered, or other than their own, is prohibited.

23. All foreign timber brought into British territory shall be reported and stopped at such stations as the Government of Bengal may from time to time direct, and such timber shall be examined and passed without delay. The persons in charge will receive a pass in the form shown in Schedule A, and the timber will be liable to detention if found afterwards without a pass in the territory to which these rules are extended.

24. All drift timber of the kinds reserved under Rule 12 which has been felled or cut in the Government forests within these provinces, will be considered the property of Government, unless proof of ownership be given.

25. Persons who may have saved such drift timber are required to deliver the same to such persons as are authorized by the Conservator of Forests to receive it on receipt of such salvage rates as may be approved by the Government of Bengal.

26. The officers of the Forest Department shall take possession of any drift timber found in any river or stream, or lying in the bed of any river or stream, within the boundaries of their districts, as to the ownership of which there may be any doubt, and the same shall be treated as drift timber under Rules Nos. 28, 29, and 30 below.

27. From time to time, as the collection of drift timber may render it advisable, public notice inviting claimants to come forward will be issued at the chief stations of the district, and in the nearest town to the place at which the timber is lying, stating the number and description of logs collected.

28. Six months' notice will be given for the reception, by the Forest Department or by the local courts, of claims to drift timber, after which, if not claimed, the timber will be sold on behalf of Government.

29. Claims to drift timber must first be sent in to the district forest officer, with particulars of marks by which it may be recognized. The district forest officer will enquire into the claim. If the claim be a single one, he may, on being satisfied of its validity, release the timber after expiration of the term mentioned in the notice. If the claim be a disputed one, he should endeavour to obtain the formal consent of the claimants to his arbitrating on their claims. Where the dispute cannot be so decided, and there exists any reasonable doubt as to the rightful owner, the forest officer will retain possession of the timber, until the question of ownership be decided by a competent Court. Provided that if no claim be preferred in such Court within two months from the date on which the Forest Officer shall declare his inability to settle the dispute, the timber may be disposed of by the Forest Officer, subject to any claims to the proceeds which may in future be established.

30. Timber awarded to claimants must be redeemed by payment of the salvage rates approved by the Government of Bengal, and other expenses which may have been incurred on account of such timber.

31. It shall be the duty of all the forest officers and subordinates to see that these rules are not violated; and should they, in any case, be infringed, to report the same without delay to the nearest magisterial or police officer in the division or sub-division in which the offence took place.

32. Any person infringing the provisions of these rules shall be liable to the punishment prescribed in Schedule B, with regard to the rules therein specified.

Schedule A.

Form of Pass for Foreign Timber imported into British Territory.

No.	Date.	Owner or Consignee.	Place of destination.	Description of Timber.	Timber marks.	Number of logs or pieces.	Total.

Schedule B.

Punishments prescribed under Section 5, Act VII. of 1865, for the infraction of Rules made under Section 3 of the Act.

Offence.	Under what Rule committed.	Punishment to which the offender is liable.
		Rs.
Felling timber or removing forest produce of any description, within the limits of reserved forests, without due authority from the Conservator of Forests.	Rule 7	Fine of any amount not exceeding ... 500
Passing through a reserved forest, except by the authorized roads or paths, after notice of prohibition from doing so by the Conservator of Forests.	„ 11	Ditto ... 50
Marking, cutting, girdling, felling or in any way injuring any tree within the limits of the open forests that may be reserved under Rule XII.	„ 13	Ditto ... 100
Felling, cutting, or otherwise using any tree, other than those reserved under Rule XII., within the limits of open forests which may be marked or girdled by the forest officers.	„ 15	Ditto ... 100
Obstructing any stream that may be kept open for the passage of timber.	„ 18	Ditto ... 200
Marking, or defacing any mark on, converting or cutting into pieces, or in any way disposing of any timber (found adrift or stranded in the rivers or creeks of any district) that may have been felled in the Government reserved forests.	„ 19	Ditto ... 200
Any private person using any Government timber brand or mark already registered, or any mark other than his own.	„ 22	Ditto ... 200

BENGAL SECRETARIAT LIBRARY.

(*RESOLUTION.*)

REVENUE DEPARTMENT.

FORESTS.

Fort William, the 2nd February 1870.

READ the progress report of the forest administration in Bengal for the year 1868-69.

There are several subjects treated in this report which ought scarcely to have found a place in a purely administrative report. Progress actually effected, and improvements which have previously been brought to the notice of the Government, form the appropriate matter for a report which professes to deal with the administration of a department during the past year; new schemes which have not been submitted for consideration, and have no connection with a year in which they were not originated, are always best presented to the Government in the form of a separate and specific report. The adoption of the latter course is the more desirable from the likelihood that, in the midst of a mass of heterogeneous statements and propositions, valuable suggestions which are deserving of full and prompt consideration may be overlooked. Indeed the Lieutenant-Governor must now inform the conservator that he is expected to submit separately any proposal which he desires to see acted upon.

2. As in the report of the preceding year, the remarks of the conservator in the report under review refer chiefly to the forests of the Sikhim and the Bhútan divisions. It appears, however, that the inspection of the greater part of these divisions has been confined to the visits of the assistant conservator, Mr. Mann, and that forests on the Bhútan side of the Teesta, which are more extensive than those on the Sikhim side, remain yet to be explored.

3. *Inspection of Forests.—Section I.—Paragraphs* 8 *to* 15.—The Lieutenant-Governor observes that, after making due allowance for the necessary deductions on account of isolated tracts, which from their position cannot be worked to advantage, the total area of forest land in the temperate parts of British Sikhim comprises an extent of 15½ square miles, which is available for the operations of this department.

4. In the absence of valuation surveys, which have not yet been attempted, no very precise data are available on which to estimate the stock of growing timber. No definite course, therefore, of future operations can as yet be accepted, though, from such information as the officers in the department have been able to obtain, it is assumed that, for the permanent maintenance and profitable working of the tracts under notice, it would be advisable to adopt measures for the renovation and re-planting of a greater part of these forests, and not to depend upon natural re-production alone. The conservator of forests is of opinion that a system of rotation, revolving within a period of a hundred years, would best effect the object of forest conservation; and it is supposed that a plan of gradual removal of growing timber, to be supplemented by artificial plantation, will secure the utmost possible immediate profit, and at the same time permit the trees of each successive instalment to attain full vigour and maturity. The conservator

proposes to plant out yearly a hundred acres of young trees in order to preserve the rotation. The annual yield would then be—

Magnolia, from	... 20 to 40	trees.
Oak and chesnut, from	... 176 „ 352	„
Other useful trees, from	... 172 „ 344	„

This arrangement it is roughly calculated, according to the present market prices of these woods, would bring in a yearly gross income of Rupees 36,800 to 73,600.

5. *Paragraphs* 16 *and* 17.—The method proposed in paragraphs 16 and 17 for the gradual removal of mature timber is approved. The Lieutenant-Governor has no doubt that, under skilful and judicious selection, large quantities of the existing stock of timber might be at once removed to the advantage of those forest tracts which it is intended to reserve. It may safely be assumed that within so extended an area of forest there must be large quantities of timber of no marketable value which it would be of advantage at once to fell and remove, with a view to effect clearances for more useful re-plantation. As it exists now, much of this timber only encumbers the land upon which it is growing, and with the establishment of the department on a permanent footing, with officers who possess a professional knowledge of the work, there is little risk that operations of this character would be injudiciously carried out.

6. *Paragraph* 21.—The sâl forests on the outer hills of British Sikhim and in the Terai cover about 31 square miles; but from the present inaccessible position of the former, it appears but little can be gained in the shape of sleepers, while the Terai forests will not be sufficiently matured for thirty or forty years to come. Under the circumstances a careful restriction of the demand upon these tracts is necessary.

7. *Paragraph* 22.—The Lieutenant-Governor is unable to pass any order on the proposal to take over on a lease the sâl forests belonging to the rajah of Sikhim, without much more detailed information than appears in the report under review. This subject must be treated separately, and it should be clearly shown what the cost to Government, per tree, would be in bringing the wood to market, and the price which it would fetch when taken there. It should also be definitely reported whether the same advantages cannot be secured from lands which are already the property of the State. It is observed that the sâl forests in the Teesta and Great Runjeet valleys in British territory contain, according to present estimates, 12,000 sâl trees fit for felling. The Lieutenant-Governor is not disposed to believe that, with careful management, the Government forests which are here referred to would be found insufficient for present demands, especially as the forests on the Bhútan side of the Teesta have not as yet been examined.

8. It is noticed that in the conservator's judgment it may be calculated that 500 mature trees can be taken yearly from the Government forests in the Teesta and Runjeet valleys, without risk to the exhaustion of the forests. This estimate will probably be largely increased by the results of the explorations of the valleys branching off from the Teesta on the Bhútan side.

9. *Paragraphs* 25 *to* 30.—From the imperfect valuations hitherto obtainable, it is estimated that out of the very extensive areas of sâl and sissoo forests in the Bhútan division, the area of forests in the western Dooars show 21 square miles in which first class sâl is the characteristic tree, and 6 square miles in which sissoo similarly abounds.

10. The conservator divides the compact sâl forests in all the eastern Dooars, which occupy, in the aggregate, 177,676 acres or 200 square miles, into four blocks. These forests have already been demarcated in a preliminary manner, and are in charge of the special department for protective purposes; but for the next twenty-five years much is not to be expected from them. The Lieutenant-Governor fully accepts the conservator's conclusion that the strictest conservancy of the sâl forests in Assam is imperative. The only sâl forests which are at present capable of yielding appreciable results are those in the Teesta and Runjeet valleys, and in the Sikhim Terai.

11. *Caoutchouc forests.—Paragraph* 39.—These forests exist in the Durrung district, and extending over an area of 585 square miles are distributed in six blocks, of which the three first referred to in paragraph 39 of the report are said to be in a very exhausted state from reckless and wanton ill-usage. Important questions connected with the management of the India-rubber forests of Assam have been under the consideration of Government during the year, and formed the subject of a special report from Mr. Mann in his letter No. 33, dated 3rd April 1869. In noticing this report, the Government of India in letter No. 456F., dated 28th September last, has suggested that the India-rubber tree should, if possible, be declared a reserved tree on all Government lands, and that it should be considered whether this can be done under the present state of the law, and whether any restrictions can be placed upon the sale of the raw produce in the vicinity of the forests. If these measures be feasible, it has been further suggested that the easiest way of securing the object would probably be to prohibit the tapping of caoutchouc trees on all Government lands in the division, and to open one or two well-defined districts or ranges only at a time; the collection of the produce being permitted under licenses, and the sale of it confined to the bazaars within such defined districts. These suggestions have been already communicated to the conservator for consideration, and the Lieutenant-Governor is awaiting his report on the point whether, in the absence of rules having the sanction of law as passed under section 4 of Act VII. of 1868, the reservation of the tree and the restriction of the sale of the raw produce contemplated by the Government of India can be effected under departmental arrangements.

12. In addition to the India-rubber tree the caoutchouc forests in Durrung contain others that are valuable for their timber, in proportions varying from 10 to 20 per cent. The Lieutenant-Governor approves of the plan suggested, of dividing these forests into three blocks, and working them successively in consecutive years. Permits may be granted to persons desiring to extract the sap, and care should be taken that plantation operations are carried on simultaneously in the block which is being worked under the permits.

13. *Soom trees.—Paragraph* 46.—In Luckimpore and in portions of the Durrung district the soom tree is reported to abound; and the tree itself is specially valuable for the food which its leaves supply to the silkworm.

The list of valuable trees found in Assam forms a very useful addition to the report. The suggestions made by Mr. Mann as contained in the 49th paragraph of the report, as to the possibility of securing the co-operation of nomadic agricultural tribes in the plantation of timber trees, in consideration of their exemption from the capitation tax, scarcely admit of definite adoption in their present form. Under the most favorable circumstances the

Lieutenant-Governor fears that the unsettled habits of these hill people will scarcely tend to secure the objects which are desired; but any communication on the subject should be made, in the first instance, to the commissioner of the division.

14. Large forests in Upper Assam still remain to be explored; but as they lie on the Brahmaputra and its tributaries the Dehing and Derang rivers, it is probable that the removal of their timber will be found both easy and inexpensive. As stated by Mr. Mann, the estimates of the value of the contents of these unexplored tracts must necessarily be very uncertain.

15. *Forests of Dacca and Chittagong.—Paragraphs* 54 *to* 59.—The extensive forests in the Dacca and Chittagong divisions are doubtless very valuable; but any scheme for bringing them under the conservancy department must await (in accordance with this Government letter No. 4093, dated 26th instant,) the orders of the Government of India on the revision and distribution of establishments, and should then be submitted in a separate and definite form. In the meantime such administrative arrangements as are practicable under executive authority, for the proper protection of the various kinds of valuable timber to be found in these forests, should be carried into effect in communication with the civil officers. The same remarks apply to the unleased forests in the Cachar district, where immediate measures should be adopted to prevent indiscriminate destruction of trees.

16. *Soonderbuns.—Paragraph* 60.—There would be very considerable difficulty and some expenditure in effectually guarding the Soonderbuns in the manner proposed in paragraph 60; but the Lieutenant-Governor has little doubt that the conservancy of these forests could be undertaken with advantage by the Government. The interests of the Port Canning Company in the forest produce of these lands terminated on the 8th September last, and it has been thought inopportune to introduce immediately any system of forest conservancy in these tracts. The subject, however, has not been lost sight of; and the fact that almost the entire supply of firewood for Calcutta and the districts in the neighbourhood of the Presidency comes from the Soonderbuns justifies the adoption of measures which, while maintaining an adequate fuel reserve under efficient management, shall contribute to the revenues of the State. A copy of the 60th paragraph of the report will be forwarded for the consideration of the Board of Revenue.

17. The remarks contained in the 61st and following paragraphs of the report regarding the gradual destruction of the sâl forests in districts of the Burdwan division have been read with interest. Comprised, as these forests appear to be, within the limits of private estates under permanent settlement, it is beyond the power of Government to interfere for the protection of timber trees when the proprietors themselves are unwilling to desist from operations, which in their opinion hold out better prospects of profit. The Lieutenant-Governor regrets to find that the general feeling of the land proprietors in this division is averse to any system of conservancy. Communications, however, upon the subject have been addressed to all commissioners of divisions requesting them to exert their influence, by advice and remonstrance, to secure what must ultimately be for the benefit of the zemindars themselves. The conservator, it is observed, proposes to take up lands under Act VI. of 1857 in the jungle mehals of Midnapore, with a view to the restoration of the once extensive sâl forests, which have gradually been destroyed, and have given place to wild coppice that is periodically cut for sale as fuel or for conversion into charcoal. The Lieutenant-Governor

questions the applicability of the provisions of the Act to such a purpose, but he will await the report which has been promised after an inspection of the localities. The suggestion contained in the 65th paragraph will be referred to the Board of Revenue.

18. The Lieutenant-Governor is not aware that any arrangements are contemplated for the conservancy of the forests and jungles in the Cuttack division by the forest department. What is contained in the report regarding the forests in the three Government estates under the superintendent of the Tributary Mehals scarcely holds out any prospect of early remunerative returns. The executive authorities, however, will be instructed to guard, as far as practicable, against reckless injury to these forests, by the adoption of rules similar to those which have been promulgated and appear to have been generally observed in the Chota Nagpore division. It is proposed to appoint an officer of the forest department to superintend the conservancy of all forests in the Chota Nagpore, Patna, and Bhaugulpore divisions, including the Sonthal Pergunnahs; but the arrangements in connection with this are not yet completed.

19. *Timber depôts.—Paragraph* 78.—Some definite proposal should be made by the conservator, after consultation with the commissioner of Cooch Behar, on the subject of securing land for timber depôts at the mouths of the principal rivers in the Gowalparah district.

20. *Reserves.—Paragraphs* 79 *and* 80.—Public notification and the legal declaration under the provisions of Act VII. of 1865, have only been extended as yet to the forests in the Sikhim and Bhútan divisions. The forest rules which were drawn up for the general administration of all forests in the lower provinces of Bengal have not yet received authoritative sanction in view of the contemplated amendment of the law in force. The arrangements, however, to give effect to any rules that may be eventually adopted, are under the consideration of the conservator of forests, with a view to the determination of the boundaries of all reserved forest tracts in each division, and the permanent appointment of necessary establishments for their supervision. The orders of Government communicating the provisional sanction accorded by the Government of India upon this subject have been communicated to the conservator.

21. *Demarcation in Sikhim.—Paragraph* 81.—The proposal that permanent demarcation should be carried out in the forests of British Sikhim must be supported in a separate report, in which the conservator should arrange his scheme in detail, giving estimates of the cost of erecting rude stone pillars or strong sâl posts, and of cutting out boundary paths.

22. *Paragraph* 87.—It is remarked that the preliminary demarcation in the Bhútan division has made satisfactory progress. In the eastern Dooars four blocks, covering an area of upwards of 13 square miles, have been permanently demarcated with sâl posts. Thirteen other tracts have also been demarcated, but the details are omitted in the report.

23. *Paragraph* 96.—The proposal to adopt the course which is pursued in the Central Provinces, and which is advocated also in the North-Western Provinces, of concentrating all felling operations into one block at a time, until all mature marketable trees are removed from it, commends itself to the Lieutenant-Governor, and he requests that this plan may be followed in the future. There can be no doubt that the expenditure incurred for establishments will be smaller when operations are thus concentrated, than when they are simultaneously extended over wide and distant

localities; and the plan will also probably secure the minimum of waste, which is the principal object for which the conservator has to contend.

24. *Nurseries.—Paragraphs* 99 *and* 100.—The Lieutenant-Governor has perused with much interest the account of the oak and magnolia nurseries, and would be glad to receive a further report as soon as the conservator is in a position to speak confidently of the fate of the younger plants. The experiment of checking the dense undergrowth around the young plants by raising a crop of potatoes, which should eventually pay for the costs of the experiment, appears judicious. A report of the results as soon as they are known should be submitted. It is satisfactory to learn that experimental plantations of teak and mahogany have been introduced in the Assam and Bhútan divisions.

25. *Section IV.—Paragraph* 109.—It is difficult to understand the exact meaning of the statement included in this paragraph. Scantlings are shown in one column in running feet, and in numbers in another; but it appears that the total out-turn of logs, sleepers, and scantlings from the entire forests of Sikhim and Bhútan amounts to Rupees 41,589. The 93 running feet of scantlings appear to have been left out from the calculation.

26. The Lieutenant-Governor is willing that the conservator should exercise his own discretion in accepting or declining contracts. The royalty of Rupees 15 per ton for logs, and 1 Rupee a piece for sleepers, appears (especially the latter) to be somewhat low; but the rates may be adopted for the present, and modified subsequently, if necessary.

27. *Paragraph* 117.—The results of transporting sâl logs last year to Calcutta are far from satisfactory; and it is hoped that greater care will be taken in future to select only such scantlings for transmission to Calcutta as are large enough to suit the requirements of the market.

28. *Paragraphs* 121 *to* 129.—The Lieutenant-Governor regrets that he is unable to sanction any outlay for the proposed blasting operations. The labor will be great, the good to be secured doubtful, and, even if secured for the time, it is likely to be undone by a subsequent flood. The operations, moreover, could not fail to be costly. The particular attention of the conservator is requested to the great waste which is likely to be induced by the felling of timber in quantities too large to admit of easy supervision. The fact that large quantities of timber have been stacked throughout such a long line as the old Darjeeling road, shows how difficult it must be found to secure the Government against waste and robbery.

29. *Paragraph* 138.—The necessary reference will be made to the Board of Revenue on the subject of a timber depôt at Goalundo, and the final determination of Government will be communicated in due course to the conservator.

30. *Paragraphs* 139 *to* 148.—The total receipts of the year are shown at Rupees 1,71,184, of which Rupees 1,68,973 was derived from the sale of timber. Out of this amount Rupees 32,153 only were received in cash, the balance being adjusted by book transfer as proceeds of sales to the public works department.

31. The total expenditure amounted to Rupees 1,26,256, of which Rupees 95,581 was incurred on account of conservancy and working, and Rupees 30,675 on account of establishments.

32. The actual surplus of the year thus shown amounted to Rupees 44,928. To this is proposed to be added the difference between the

assets and liabilities at the commencement and close of the year, amounting to Rupees 68,586; but the Lieutenant-Governor does not perceive that this difference is clearly exhibited in any portion of the report or its appendices, as ought to have been done. The total has further to be augmented by the collections of forest revenue made by the district officers in the different divisions in the lower provinces, which amounted to Rupees 53,362, and this makes the aggregated surplus amount to Rupees 1,66,876, as under:—

	Rupees.
1. Surplus of collections made by the forest department over expenditure	44,928
2. Difference between assets and liabilities at commencement and close of the year	68,586
3. Forest collections by district officers...	53,362
Total Rupees..	1,66,876

This large surplus is satisfactory.

33. *General.—Paragraphs* 149 *to* 155.—These paragraphs refer to subjects which are being treated, specially, in other correspondence, and do not therefore call for any comment in this place.

34. The thanks of the Lieutenant-Governor are due to the present conservator, Lieutenant Stenhouse, and to the assistant conservator, Mr. Mann, for the careful and intelligent reports which they have submitted, and which amply prove the interest they entertain in their work. The general review of the year's operations shows the very vast areas of forest which are capable under efficient management of large remunerative returns to the State. For the administration of these forests on proper principles, the existing arrangements and establishments are altogether inadequate, and very little of real advantage can be anticipated till the system of control and management has been placed on a permanent basis. Progress, however, has been made in many directions. Attention has been effectually drawn to the great waste hitherto prevailing in this valuable State property, and measures have been adopted to guard, as far as the extensive areas under forest permit, against further destruction. Officers skilled in the profession of forestry are already occupied in the management of the tracts which have been reserved under the provisions of the law, and practical arrangements enforced for the renovation and re-plantation of valuable trees on systematic and scientific principles. The Lieutenant-Governor trusts that the ensuing year's report may show the consolidation of fixed forest establishments in all forest divisions in the lower provinces.

RIVERS THOMPSON,

Offg. Secretary to the Govt. of Bengal.

No. 387.

Copy forwarded to the conservator of forests, lower provinces, in reply to his report No. 254, dated 14th September.

No. 388.

Extracts of paragraphs 60, 65, and 138 of the report, and of paragraphs 16, 17, and 29 of this resolution, forwarded to the Board of Revenue, for consideration and report.

By order of the Lieutenant-Governor of Bengal,

Fort William, *The 2nd February* 1870.

H. S. BEADON,

Offg. Under-Secy. to the Govt. of Bengal.

F. P.

PROGRESS REPORT

OF

FOREST ADMINISTRATION IN BENGAL

FOR THE YEAR 1869-70.

Calcutta:

PRINTED AT THE BENGAL SECRETARIAT OFFICE.

1870.

No. 155.

FROM

H. LEEDS, ESQ., *Conservator of Forests, L. P., Bengal,*

To

THE SECRETARY TO THE GOVERNMENT OF BENGAL,

FORT WILLIAM.

SIR,

I HAVE the honor to forward the Annual Forest Report for the Lower Provinces of Bengal for the year 1869-70.

I have the honor to be,

SIR,

Your most obedient servant,

H. LEEDS,

Conservator of Forests, L. P.

CONSERVATOR OF FORESTS' OFFICE,
L. P., BENGAL;
Calcutta, the 27th July 1870.

Progress Report of Forest Administration in the Lower Provinces, Bengal, during the year 1869-70.

This report is divided into the following sections, as directed in standing order No. 2 Forests, dated 9th October 1866 :—

Section I.—Inspection of Forests.
„ II.—Reserves.
„ III.—Plantations.
Section IV.—Yield of the Forests.
„ V.—Financial Results.
„ VI.—General Remarks.

2. The financial results are given in the eight accompanying statements, prescribed in Circular No. 8, dated 10th August 1866 :—

1. Summary of revenue and expenditure.
2. Abstract cash account.
3. Statement of outstandings.
4. Statement of timber brought to depôts.
5. Annual timber account.
6. Statement of amount realized by sale of timber.
7. Statement of expenditure on account of timber.
8. Annual account of forest revenue.

SECTION I.—INSPECTION OF FORESTS.

Assam—general inspection.

1. The general inspection of the forests in Assam, which was commenced in 1868-69, and confined to the north side of the Brahampootra river, between the Monass river and Debrooghur, was continued during 1869-70 in Luckimpore and the districts of Seebsaugor, Nowgong, Naga Hills, and Khasi and Jynteah Hills on the south side of the Brahampootra. A detailed account of the inspection will be found in Mr. Mann's report in appendix. A short abstract is given here for ready reference.

Forests in Luckimpore.

2. The Luckimpore forests may be divided into two main groups :—

1*st.*—Such as are within the mouzas, or boundaries over which the civil authorities exercise control.

2*nd.*—Those beyond these boundaries and police outposts, and in which it might not be advisable, for political reasons, to introduce conservancy measures, but from which large local supplies of timber can be procured, the forests being rich in timber.

3. The forests *within* the mouzas are the following:—

1*st.*—Those on the left bank of the Brahampootra opposite to Suddia and Deebroomook. These forests are inferior, and have been much worked to supply the saw-mills of the Upper Assam Tea Company, and the station of Debrooghur. Boats to contain about 30 maunds are freely cut from these forests. Water carriage for the transport of timber is very good in these districts.

2*nd.*—The forests on the banks of the Debroonuddy. From these forests the timber supply for the North East Saw Mills Company's operations is procured.

3*rd.*—The forests between the Deebroomook and the Boree Dehingmook.

These forests extend over an area of 30 square miles. They are rich in forest trees.

4*th.*—The forests in the lower Dehing river, and tributaries from Dehingmook to Jeypore.

These cover an area of about 560 square miles. In these forests *aghan* (lagerstrormia regina) and poma (cedrela toona) are exceptionally fine; but they have been heavily worked by the Dehing Saw Mills Co., and large trees by the river banks are scarce.

5*th.*—The forests on the upper Dehing river, from Jeypore to junction of Dehing and Tirrap nuddies. These forests cover an area of 120 square miles.

6*th.*—The forests on the right bank of the Dehing river within the Luckimpore district.

They extend over an area of about 120 square miles.

These forests contain most of the varieties of woods mentioned in last year's report as met with in Assam.

4. The forests *beyond* the mouzas were not inspected, but much information was obtained regarding them.

Forests in Seebsaugor district.

5. In the Seebsaugor district the forests are very scattered, and large portions of them have been taken up for tea cultivation. Their probable area has not been estimated.

The more important tracts are :—

1*st*.—The forests on the Dehing nuddy.

2*nd*.—Those between the Dehingmook and Jhangeemook.

3*rd*.—That portion of the Nambur forests on the left bank of the Dhunsiri river covering an area of about 25 square miles. This is superior forest, containing large quantities of the best kinds of timber.

4*th*.—Those on the left bank of the Kullanee river.

These are also very fine forests, and have not yet been worked.

All these forests contain the same kinds of timber as the Luckimpore forests, but they are not generally so rich.

Forests in the Naga Hills.

6. The Naga Hills are said to contain some of the most valuable forests in the province. They are estimated to cover 1,288 square miles, and are as follows :—

1*st*.—The Doyang forest, south of Golaghat, extending over an area of 280 square miles.

2*nd*.—The Dhunsiri forest, west of the former, on a stream of the same name, covering an area of 280 square miles. This forest has been reserved, and is in charge of a forest-watcher.

3*rd*.—The Kullanee forest, on a stream called the Daeegoorong, extending over an area of 160 square miles. The forests on the upper Jamoona nuddy, the area of which is 128 square miles. This latter is inferior to the other forests, and has been joomed to a great extent.

All these forests contain much the same class of timber as the forests in the Luckimpore and Seebsaugor districts.

Forests in Nowgong district.

7. In the Nowgong district the forests are chiefly sal, and very inferior. Joom cultivation has been carried on in these. The chief tracts now left are the Nurpoo forest, the Nangee, Lakadang, and Batoo.

Forests near the hill station of Shillong.

8. Near Shillong forests of *pinus longifolia* are extensive, but all in the hands of private individuals, with the exception of about seven square miles of land belonging to the station. This tract, if properly cared for, will supply the wants of the station.

Forests in the Khasi and Jynteah Hills.

9. In the Khasi and Jynteah Hills the forests are all the property of the local rajahs. The timber in them is scarce, and suffers much from jungle fires.

Area of forests in Assam.

10. The area of valuable forest tracts in Assam may be roughly estimated at 4,000 square miles, so far as we are at present acquainted with them.

General.

11. The next work will be to select certain tracts which will, under notification in the *Gazette*, be declared Government forests. These will be put in charge of the forest establishment, and from these the richer tracts will ultimately be selected and demarcated as "reserved" forests.

12. It is evident that until our knowledge of these tracts becomes much greater than it is at present, it is premature to form any speculations as to the plan upon which they should be worked. For some time to come the operations will be general on mature and accessible timber, so that demands for timber may be assisted, markets opened, and the trade gradually developed. This work is of slow growth, and must not be injudiciously pushed. A balance

must be retained between expenditure and probable returns for some time to come. Revenue will flow in by and bye, and operations, together with effective establishments, in which natives of India can be largely employed, can then be increased.

SECTION II.—RESERVES.

13. The reserved tracts of forest now in charge of the Forest Department are the following :—

In Assam.—The Nambur forests—area about 25 square miles, and the Dhunsiri forests—area about 720 square miles.

14. In Sikkim.

15. Bhutan Dooars—

Eastern Dooars.

In Sidlee.

	Acres.
Hattagaon	2,676
Lalbaree Borolutharee ...	7,421
Bhogamgooree	1,372
Pursungaon	175
Bansbaree	1,856
Salbaree Kareegaon ...	2,312
Khuteepooree	7,474
Aboogaon	1,094
Oodhubgaon	1,578
Nareckola Koreepola ...	1,531
Chowdregaonjhar	1,403
Kekteebaree	5,864
Doleagamjhar	2,590
Chologaonjhar	2,928
Chedarnaree Doomreegaon ...	2,907
Patgaon Dhobgooree ...	3,839
Poondebareejhar	580

In Bijnee Dooar.

Khairbunna	8,039

In Cheerung Dooar.

Lymooteejhar	19,678
Bhoomegaonjhar	25,253
Pauhareejhar	6,340
Chikleejhar	16,159
Goondagaonjhar	1,775
Pokeehageejhar	9,340
Koochooharejhar Jhatparee ...	10,094
Bunglajhar	4,842
Singmaijane	8,520
Sotagooree	6,942
Gobdagaon Aphal ...	11,130
Janagaon	8,895
Janagaonjhar	28,325

In Gooma Dooar.

Salbaree	15,779

In Repoo Dooar.

	Acres.
Surraigaonjhar	7,232
Notogaonjhar	22,226
Koochoogaonjhar ...	12,177

Western Dooars.

In Buxa sub-division.

Ateabaree Doldabree ...	7,018-25
Borojhar Satalee	26,400
Chokakbeetee Pasteesal ...	436
Chooarpur Jaganjee ...	15,522-50
Natabaree	7,000
Neemtur Domohone ...	2,248
Oodlagoree	6,718-51
Patkaparee	1,200
Raimatong	8,567-13
Boromallee	21,208-08
Chokeerbos & Chokeerbosjhar ...	3,001
Mynagaon	6,974-31
Painalgooree	624
Panbaree	26,497-10
Sunniasijhar	4,706-05
Salbaree	8,343
Mahakalgooree	72

In Monaghat sub-division.

Borogeelajhar	11,466
Borodighee	11,747
Tandoo, East	3,785
———, West	17,730
Dhapjora	1,550
Khulabaree	5,540
Khairkata	1,569
Doodoomaree	566
Banarbast	403
Salbaree	3,403
Khairkata (Part II.) ...	1,600
Nepavea	172
Doomchee Chapagoree ...	609

Statement of areas, &c.

The following statement furnished by the Assistant Conservator from records in the division is worth inserting :—

	Total area.			Area cultivated acres.	Forest land acres.	Culturable waste acres.	Unculturable waste acres.	Population.			
	A. R. P.		Square miles.					Hindoos.	Musselmen.	Mecchis.	Garos.
Eastern Dooars.											
Gooma ...	61,530	0 38	96·14	3,701	15,709	39,353	2,677	733	51	215	...
Repoo ...	1,54,889	1 37	242·02	2,474	41,635	1,02,733	8,047	92	8	802	215
Cheerung ...	3,16,889	1 5	495·14	292	1,56,293	1,66,914	5,295	...	...	278	...
Sidlee ...	2,30,794	0 27	360·62	18,307	47,600	1,55,168	10,299	700	23	4,357	...
Bijnee ...	2,39,483	1 27	374·19	20,140	8,039	1,89,730	21,574	6,080	3,673	142	...
Total ...	10,03,586	2 14	1,568·11	44,014	2,69,366	6,53,898	47,892	7,605	3,755	5,794	215
Western Dooars.											
Main circuit No. 1	1,22,571	0 63	...	58,528	...	48,945	15.098	22,208	5,169	164	...
Ditto „ 2	1,91,974	0 10	...	2,654	53,387	1,29,566	6,367	957	16	618	...
Ditto „ 3	1,69,170	0 09	...	10,729	5,972	1,42,634	9,835	3,910	256	498	...
Ditto „ 4	1,80,657	0 89	...	10,099	781	1,61,343	8,434	4,321	306	1,560	...
Ditto „ 5	2,16,437	0 30	...	5,409	75,109	1,20,622	15,237	1,840	91	571	...
Ditto „ 6	2,14,674	0 74	...	15,103	63,082	1,12,735	23,754	2,855	208	375	437
Ditto „ 7	76,041	0 13	...	8,804	8,343	57,382	1,512	3,037	128	52	70
Total ...	11,71,526	0 88	...	1,11,386	2,06,674	7,73,227	80,237	39,128	6,174	3,838	507

Demarcation of reserves.

16. The demarcation of reserves in Assam will be commenced next season. The boundaries of the reserves in Sikkim and Bhutan are fixed, and most of them demarcated with strong sal posts where natural boundaries or the boundary marks of mouzas do not exist. This work will be proceeded with next season in Bhutan and completed.

Valuation surveys.

17. Regular valuation surveys of all these reserves must now be commenced so as to ascertain, with some measure of accuracy, what timber of the different classes they contain. The estimates and calculations hitherto made have no real value. Certain reserved tracts will be selected for next season's forest operations, through which lines will be cut, dividing them into blocks where necessary. Surveys can then be accurately made, and at the same time the timber which should be felled and removed will be marked, and arrangements made to glean the forest of all fallen timber which it may be advisable to clear out. Until lines of road are cleared, we cannot expect our forest-watchers to go into the tracts, and many of them are at present mere covers for wild animals of all kinds. Once properly examined, future arrangements as regards periods of working and clearing can be determined on ; but at present it is premature to lay down any rule on the subject. This plan of examination and working will concentrate operations, and, it is hoped, lead to better results than have been obtained at first starting. Possibly by the time all the reserves in the plains have been systematically worked, some plan will have been discovered for working the forests above the plains on the Teesta and tributaries, the working of which has up to the present time been carried on with doubtful success, due to the inexperience of the assistants in charge, and the difficulties which attend the bringing down unfloating timber in a stream like the Teesta above the plains.

SECTION III.—PLANTATIONS.

Temperate forests—Rungbool.

18. In the temperate forests the Rungbool plantation was increased by 180 acres. This area was planted out with oak, magnolia, and walnut, from the seed-beds prepared the previous year. Vacancies in the former plantation were also filled in. Two acres of the above area bear a potato crop, referred to in paragraph 101 of last year's report. This crop is now ripening, and on this ground transplants from the nursery beds will be put in so soon as the weather admits. The system of extending plantations by first clearing the ground and sowing various cereal crops the first and second year was commenced in British Burmah some years ago, and it is hoped will be found to succeed eventually in these provinces. A potato crop, however, is not one well suited for such operations.

19. As regards this Rungbool plantation, it is not proposed to increase it at present, except so far as planting out existing seedlings in the nurseries is concerned. The results of the past work must be watched for three or four years, so that experience may be gained as to the course which should in future be taken. To enclose plantations is to incur a great expense; and as the depredations of deer and other animals may have to be guarded against, the subject of continued plantation on that spur requires mature consideration. No doubt field mice do much mischief; but as regards the reports regarding deer, which are said to come in and "top" the young plants, no clear evidence has yet been produced on the subject; and much of the "topping" observed is probably due to the improper handling when the plants were taken up from seed-beds and forests and transplanted.

This is one of the chief disadvantages of transplanting in this country. Skilled labor cannot at first be procured. There is no doubt that transplanting from nurseries, as a rule, is the best system for plantations; but this system is sometimes deviated from with advantage at the commencement of operations, and it also saves considerable expense.

Outer hills—Bamunpokree.

20. The teak plantation at Bamunpokree, at the foot of the hills, promises well. The vacancies in the first season's planting were very numerous, and must be attributed either to a large proportion of the seed having been bad, or to its having been covered too deep with soil. I visited the plantation in June 1870. The plants of the first year that had come up were from 5 to 7½ feet high, strong and vigorous, showing shoots of this season's growth 2 feet in length, although the rains had only set in a very short time. These plants are not yet two years old.

The seed placed during 1869-70 in the vacant spots of the previous year's plantation have come up profusely, and will furnish transplants for a considerable area to be planted during these rains, 1870-71. The irregularity of the height of these seedlings leads to the belief that many of them are from seed planted in 1868-69, which had been covered too deep with earth and could not at once make head-way.

Proposed plan of operations.

21. It is proposed to continue this plantation actively on the system I pushed with every endeavour in Burmah some years ago, and which appears to be answering well, and is recommended by the Chief Commissioner of British Burmah as being the best system for securing extensive plantations. The system consists in employing cultivators to settle on the ground to be planted, getting them to clear the land and obtain their own crops off it, while they at the same time plant the seed of the trees we wish to grow. The cultivators are induced to do this by giving them their land free for one or two years. Whether the land tax of these areas should or should not be debited afterwards to the Forest Department, is a question which has already been brought before the Government of India by the Chief Commissioner of British Burmah, and the decision arrived at will no doubt rule our operations here. It is obvious that by getting the land cleared and prepared we save the chief expenditure necessary for a plantation, and that

the trifling amount due for land tax is a mere bagatelle, which may well be borne by the Forest Department if it be so decided. It is unnecessary to elaborate the system here, as it already forms part of the printed records of the Government.

This plantation will be of mixed toon and teak, and serve chiefly for supply of local demands. These are likely to be very great, and at present there are no growing supplies of timber. For tea boxes and building purposes, charcoal, &c., these woods will be very valuable, and produce hereafter a considerable revenue with little original outlay. To carry out the plan and ensure favorable result requires tact and efficiency on the part of the officer in charge; add to this also a personal interest in its success.

Western Dooars.

22. In the Western Dooars a small plantation of teak, on the river near Ramshai, was made, and the seeds have germinated freely. Their height is very irregular, probably due to covering the seed too deep with earth. Some of the plants are four feet high, while others are only just a few inches above ground,—evidently only of this season's growth.

Upper Assam.

22A. In Upper Assam also teak seed was planted on a small area (one acre) in the Dehing forests. Here also the seed has germinated, but no detailed report has been received.

Object of these experiments.

23. These scattered little plantations have been made simply as experiments from which to collect data for future operations, and thus not to lose time. It is not proposed to scatter teak plantations all over the country, but it is of importance at once to sow teak and test the soil and climate suited to it here, as it will be advisable hereafter to select certain compact localities in each province suitable for the growth of teak and carriage of timber for future supplies, teak being from its lightness easy to float in rafts and transport to any market, while its qualities as timber are unsurpassed for almost all kinds of building and shipping purposes.

Chittagong district well adapted for plantations.

24. The Chittagong district will probably hereafter supply large quantities of teak. Its splendid water carriage from all parts of the district render the floating of timber to the port safe and easy, and there it can be shipped at little cost.

The Solmye range of hills in the Tipperah district, noticed by the Commissioner in March last as likely to be a good locality for plantations, will be surveyed next dry season with reference to this point; but its distance from a port, and the danger that would attend the floating of timber out of the Fenny river, below the mouth of which the "bur" is very heavy, and there is no place of safety for timber to lie, will probably give more accessible localities a preference.

SECTION IV.—YIELD OF THE FORESTS.

25. The quantity of timber extracted from the forests during 1869-70 was very limited, as shewn in statement below :—

SIKKIM DIVISION.

	Temperate forests.	Tropical forests.	Bhutan division.	Total out-turn.
Logs and pieces	...	...	1,165	1,165
Sleepers	...	2,847	14	2,861
Total ...	...	2,847	1,179	4,026

26. One hundred and seven logs were felled, logged, and barked in the Dehing and Dhunsiri forests, in Assam, but they were not removed during the year, difficulties as to labor having arisen. The prices asked for removal were so great, that it was deemed best by the Assistant Conservator not to accept them. Disease among buffaloes in the district has made them scarce, and the owners of elephants at present find it more profitable to employ their elephants in catching others than in dragging timber. These difficulties naturally arise at first, but they must be overcome. An efficient district officer can always bend the means at hand to suit the object to be gained.

Work in Assam.

27. The operations in the Sikkim division, as will be seen from statement of timber brought from the forests, were confined entirely to removal from forest depôts of logs and sleepers, which had been prepared during former seasons, to station depôts.

Work in Sikkim.

Fourteen thousand two hundred and fifty-five sleepers were carted from Sookna and Sivok to Siligoree.

Two hundred and eighty-seven logs and 5,567 sleepers were floated down from Ryeng, a forest depôt above the rapids in the Teesta, to Sivok depôt, situated at the exit of the river from the mountains into the plains; but of these only 81 logs and 5,355 sleepers arrived at Sivok. The loss in transit is therefore still very large, causing both waste of material and labor, the larger portion of which falls upon Government.

28. Until some better means of extracting timber from the forests above the rapids has been discovered, work in these localities must cease. Some adaptation of "sky railways," or rather system of wire ropes, to act as guides for the passing down of timber from high and difficult localities, will no doubt by and bye become practicable. As inquiry is made, and the subject becomes better understood, large tracts of forest in the mountains will become available to meet the wants growing up on every side; but for the present it seems advisable to turn to other and easier localities for such supplies as are required.

Difficulties of extracting timber in Sikkim.

29. During the past year 100 logs and 42 sleepers, which had been lost in river transit during previous years, were recovered; these are included in the statement of timber in hand.

Recovery of lost timber.

30. No timber was felled or extracted from the temperate forests. There are still 1,599 logs in stock on the old Darjeeling road, seasoning for future use. When work on the new barracks is resumed, all this timber will speedily be cut up. It is perhaps better to await final orders regarding the building of the barracks before extracting any more timber, especially as it is not proposed to extend the Rungbool plantation at present for reasons mentioned in Section III.

31. It would be of material advantage if the Public Works Department would give timely notice to the Forest Department of the timber they are likely to require during two or three years for large works, in order that preparations might be made to meet these requirements. The Forest Department cannot be expected to lay out large amounts for extracting timber from the forests without some guidance as to what quantity of timber is likely to be required, and when it will be taken over.

Department Public Works to give notice of yearly requirements of timber.

32. The present system of obtaining timber just at the time it is required entails very serious ultimate expenditure, as all the wood used is green, and thus not only is the quantity of timber used three or four times what it would be if seasoned, but the labor and material of all kinds employed is also renewed and paid for three or four times instead of once.

Use of green timber very expensive.

It is certainly advisable that the officers of the Public Works Department should be unfettered, and make their own arrangements in purchasing the timber they require on the

easiest terms, but temporary cheapness leads often to ultimate dearness. The relations between the Public Works Department and the Forest Department might be improved with advantage to the state.

Pine timber from Great Runjeet not removed yet.

33. No attempt was made to bring out any of the pine logs extracted from the rajah of Sikkim's forests and launched into the Great Runjeet, a tributary of the Teesta, the former year. As this timber will float, no great difficulty need be apprehended in getting it down to Sivok; the Assistant Conservator should therefore have turned his attention to it.

Purchase of timber from Sikkim Rajah.

34. A purchase of 1,200 sal logs from the same forests was made during the year, at Rs. 2-8 per log. It is to be regretted that the Assistant Conservator, who was well acquainted with the difficulties which attend the bringing down of timber in the Teesta, and before he had tried floating out the pine lying in the Great Runjeet, should have concluded this purchase.

Timber received in Western Dooars.

35. Of the logs referred to in paragraph 135 of previous report, 185 have been received at the Monaghat depôt.

Different systems under which timber is worked out.

36. It may be well before closing this section of the report to make a few remarks on the subject of the different kinds of labor employed for extracting timber from the forests. There seems to be some misapprehension on the subject, judging from the remark which closes the despatch from the Secretary of State for India, dated 10th March 1870, with reference to the annual report for the Lower Provinces, 1867-68.

The systems employed (if they may be so termed) are as follows:—

1*st*.—By means of permit-holders.
2*nd*.—By means of Government agency.
3*rd*.—By means of petty contractors.
4*th*.—By means of extra establishment.

I divide them under these four heads, not because the three last differ very materially from each other, but because there are certain Government orders existing which approve of work under some of these, while discountenancing or forbidding it under others.

37. The difference in the system may be thus explained.

Permit system.

The first, or permit system, differs entirely from the others in that the permit-holder pays a fee for his permit or right to fell and remove timber marked by the Forest Department from a certain forest tract. He bears all the expenses of extracting the timber, which becomes his property on payment of a fixed royalty per log before he takes possession of it; while under the other systems the Government retain possession of the timber and dispose of it as they please, they making all contracts and bearing the entire cost of extracting it.

Government agency.

38. By Government agency is meant that the district forest officers employ contractors, supervised by themselves and their sanctioned establishment, to bring out the timber from the forests.

Petty contractors.

39. By petty contractors is meant that a number of contractors with small means are employed to perform the various operations which attend the extraction of timber from the forests, which are thus sub-divided into a number of petty contracts. For instance, some contract to fell, some to saw and convert, some to drag, some to float, some to cart.

Extra establishment.

40. By means of extra establishment is meant the employing, on the authority of the Conservator only, extra establishment, that is, establishment beyond the regular sanctioned scale of establishment for a division, to supervise and carry out work which should just at that time, for special reasons, be done, but for which, perhaps, no efficient contractors can be obtained, and which, owing to other

work, such as demarcating forests, marking timber plantations, and inspection of forests, the divisional officer cannot personally attend to. This establishment is charged to the work performed.

Remarks on the different systems.

41. As regards the permit system.

The disadvantages generally brought against it are—

1*st.*—That the forests cannot be so well protected from damage, and

2*nd.*—That the value obtained for the timber is not so great as if worked out and sold by Government.

Its advantages are, that the district forest officers are comparatively free to look after a host of divisional work which ought to be attended to, but must be neglected if he really looks after the contractors working in the division. Large advances of cash are unnecessary, and the losses which constantly arise are avoided. Government do not suffer loss of any timber which is lost in transit, as it has to be paid for (or at least security for payment is given) at a local station near the forests whence it is extracted. The operations carried on in the forests are more under superintendence than they can be under Government agency, as permit-holders have an unlimited staff in their employ, and can better control the work than Government watchers. All divisional accounts are very much simplified and decreased. Penalties for breach of permit rules are not difficult to enforce, and by this means destruction in a forest is arrested. A permit-holder is, or ought to be, a man of substance, from whom a penalty can be recovered, and, at any rate, Government have a security in the timber he has brought out, and which can always be stopped.

42. As regards a contractor, Government have no hold upon him whatever. He has no property even to offer as real security for the advances made to him, and consequently in case he commits a breach of contract rules, or destroys any trees in the forest, Government have no hold upon him. He cares no more about destroying young trees in the forests than a permit-holder; on the contrary he cares less, as he has less to lose. He can as easily cut down a tree not marked by the department as a permit-holder: the check over him is of no value. In fact, marking trees in the wild and scattered forests of India is, I fear, of little value. As a rule, the only real check to destruction of forests is limit of size of tree to be felled. In compact pine forests any check can be established, and a breach of rules immediately discovered; but this cannot be the case in unreserved forest tracts, which nevertheless contain a large supply of timber.

43. As regards the gain on timber extracted under the permit system not being as great as under the Government agency, this has by no means been yet clearly proved; but if this be so, the rates have only to be raised sufficiently to equalize the sale. I am certain Government derive great advantages, direct and indirect, from the permit system, and introduction of a better class of men to the working of forests. There is no doubt that individuals, especially natives, can work cheaper than Government. The regular establishments which Government sanction are totally inadequate to a grasp of the work which should be done in a division. Here and there a breach of forest rules in felling may be discovered; but while timber is being and must be extracted, I know very well that the district officer's check over breaches of rules cannot be efficient any more over contractors than over permit-holders: indeed, I feel sure we have more hold over the latter than over the former.

44. An officer who has to superintend the carrying out of forest timber contracts, and to attend to all the money payments and the accounts, is entirely occupied by these to the exclusion of all the district work which ought to be done.

How is he to survey and estimate forests in his division—how mark the timber to be felled—how attend to plantations—how look after a multitude of matters which he ought personally to superintend and should not be delegated to subordinates? It is simply impossible, and the result is that very important work is not done.

Government agency.

45. Government agency needs no further remark, as its working is pretty well shown in the remarks regarding the permit system.

Petty contractors.

46. Petty contractors and extra establishment may be taken together.

The necessity for employing petty contractors is obvious, and Government of course sanction this system, by which to get work done ; but extra establishment to be employed as occasion at the time may require has been objected to until sanction has been obtained. Before sanction is applied for and obtained, the season for the work has very possibly passed away. The Conservator should not be debarred on his own responsibility from employing extra establishment to perform a certain work which appears to him advisable under certain circumstances, and which the regular establishment is unable at the time to perform.

Such establishment is particularly advisable and necessary at the begining of forest organization, when the district officer's time is much taken up with the examination of forests, laying down boundaries, and opening out work in different parts of his division. Suitable men are at times met with for such temporary work, whom it would be advisable to entertain, and who become valuable recruits for the future, having gained local experience and knowledge.

SECTION V.—FINANCIAL RESULTS.

47. The financial results of the departmental operations during the past year are as follows :—

	Rs.	As.	P.
Receipts	40,200	0	0
Expenditure	95,874	0	0
Deficit ...	55,674	0	0

48. The difference between assets and liabilities at the commencement and close of the year was Rs. 18,942, which reduces the deficit to Rs. 36,732.

Collections by civil officers.

49. The collections made by civil officers on account of forest produce amounted to Rs. 73,552 during the year.

Nett revenue received from forests in the Lower Provinces.

The nett revenue received from the forests in the Lower Provinces during 1869-70 was therefore Rs. 36,820.

Value of timber in hand.

50. The following statements, showing the value of timber in hand at the beginning and end of the year, taken at same rates as the previous year, show an increase of Rs. 20,844, which forms part of the result of the past year's operations.

Statement of value of timber in hand on 31st March 1869.

Description of timber.	Quantity. Number of pieces.	Quantity. Cubical contents.	Estimated selling rate per 100 cubic feet.	Estimated value
In Station Depôts.			Rs. As. P.	Rs. As. P.
Logs	2,236	61,306	150 0 0	91,959 0 0
	311	13,570	62 8 0	8,481 0 0
	608	29,935	50 0 0	1,4967 0 0
Karla Kumbers	365	.....	0 4 0 each	91 0 0
Saplings	2,312	.	0 3 10 "	553 0 0
Shingles	104,000	19,448	3 0 0 per hundred.	312 0 0
Sal sleepers	17,076	58,105	0 0 0	0 0 0
Oak ditto	114	374	2 6 0 each	40,826 0 0
Scantlings	10	40	100 0 0	40 0 0
In Forest Depôts.				
Logs	4,406	140,471	34 4 0	50,166 0 0
Sleepers	42,139	143,387	44 1 3	63,202 0 0
Total .	173,667	472,630		2,70,597 0 0

Statement of value of timber in hand on 31st March 1870.

Description of timber.	Quantity.		Estimated selling rate per 100 cubic feet.	Estimated value.
	Number of pieces.	Cubical contents.		
In Station Depôts.			Rs. As. P.	Rs. As. P.
Logs	2,707	101,681	150 0 0	1,52,521 8 0
Sleepers	21,244	72,274	2 6 0 each	50,454 8 0
Scantlings	10	40	100 0 0	40 0 0
Shingles	88,000	10,456	3 0 0 per hundred.	264 0 0
Saplings	486	.....	0 3 10 each	116 7 0
Karal Kumbers	851	.... .	0 4 0 „	212 12 0
In Forest Depôts.				
Logs	4,667	153,465	34 4 0	52,591 12 2
Sleepers	23,464	79,850	44 1 3	35,196 6 1
Planks	241	126	22 5 0	28 1 9
Karla Kumbers	370	...	0 2 0 each	46 4 0
Total .	142,130	423,892		2,91,441 11 0

51. The only sale of any importance during the year was one of 12,351 sleepers to Messrs. Dear and Co.

Selling rates of timber to be revised.

52. The rates which were fixed as a tentative measure for the sale of timber in 1868-69 will now be revised with reference to the decreased rates at which it is found possible to extract timber from the forests. In Sikkim and Bhutan during the past three years they have shown a tendency downwards, and it is hoped that with the careful attention of district officers they will continue to do so until a satisfactory rate has been obtained. Work at the commencement of operations is necessarily expensive, but every care will be taken to decrease expenditure as the real cost of forest operations becomes well known to the contractors.

Alterations in statements.

53. Some alterations have been made in statements 26 and 27, by which they have been simplified without sacrificing any information which they are intended to give.

SECTION VI.—GENERAL.

Tour of the Conservator.

54. The tour of the Officiating Conservator comprised the districts of Sikkim, Bhutan and Assam. Lieutenant Stenhouse left the Lower Provinces after giving over charge to the Conservator, who returned from sick leave on the 2nd May 1870. Having left no records of his tour, he has been asked to furnish a memorandum of the information obtained by him, to be appended as an appendix to this report, should it come in time.

Appointment of officers.

55. Assistant Conservators have been appointed since the close of the past year to the Chittagong and Dacca divisions, and as provisional sanction has been accorded to the appointment of an officer for the Bhaugulpore division, the next report will include these three divisions.

56. The Lower Provinces have not been fortunate enough, owing, no doubt, to more pressing requirements elsewhere, to obtain the services of any of the trained officers who have come from Europe; and as even the transfer of an experienced officer from other divisions has not been made to fill the executive staff of forest officers in these provinces, the Conservator is very much in the position described by the Inspector-General at paragraph 28 of his report dated 6th July 1869:—"To appoint men to the charge of forest divisions who are not competent in these matters would almost be equivalent to compelling Conservators of Forests to work without tools, or to make bricks without straw." Progress, of course, must be in proportion to the time it takes to educate the officers.

H. Leeds,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual summary of revenue and expenditure in the different divisions during 1869-70.

Classification.	Direction.	Sikkim.	Bhutan.	Assam.	Total.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Revenue.					
I.—Sale of timber at depots	0 0 0	35,000 0 0	824 13 3	0 0 0	35,824 13 3
II.—Sale of timber removed by purchasers	0 0 0	659 0 0	0 0 0	0 0 0	659 0 0
III.—Duty on foreign timber	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
IV.—Permit fees	0 0 0	2,130 4 0	0 0 0	0 0 0	2,130 4 0
V.—Grazing dues and fisheries	0 0 0	1,156 1 0	0 0 0	0 0 0	1,156 1 0
VI.—Sale of fruits, babool pods, &c.	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
VII.—Sale of confiscated timber	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
VIII.—Fines and forfeitures	0 0 0	130 5 9	0 0 0	18 0 0	148 5 9
IX.—Miscellaneous	0 0 0	128 0 0	51 8 0	102 8 9	282 0 9
Total	0 0 0	39,203 10 9	876 5 3	120 8 9	40,200 8 9
Expenditure.					
A.—Conservancy and working.					
I.—Timber expenses	0 0 0	30,305 6 0	5,476 9 0	89 0 0	35,870 15 0
II.—Purchases of stock and cattle	0 0 0	4,991 0 0	6,542 2 0	566 14 0	12,100 0 0
III.—Feed and keep of cattle	0 0 0	339 15 0	565 0 0	771 6 0	1,676 5 0
IV.—Rent of leased forests	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
V.—Charges in collecting revenue on grass, &c.	0 0 0	35 5 0	0 0 0	0 0 0	35 5 0
VI.—Plantations	0 0 0	3,403 6 0	133 14 0	70 5 0	3,607 9 0
VII.—Forest work	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
VIII.—Forest Survey	0 0 0	0 0 0	82 0 0	3,276 0 0	3,358 0 0
IX.—Experiments on timber	0 0 0	0 0 0	0 0 0	21 0 0	21 0 0
X.—Communications and buildings	0 0 0	3,657 8 0	494 3 0	183 2 0	4,334 13 0
Total conservancy and working ...	0 0 0	42,732 8 0	13,293 12 0	4,977 11 0	61,003 15 0
B.—Establishments.					
I.—Salaries	11,080 11 9	7,598 15 0	2,533 7 0	6,188 0 0	27,401 1 9
II.—Allowances	1,730 4 4	1,585 2 0	150 5 0	1,204 3 0	4,669 14 4
III.—Contingencies	1,357 2 9	558 1 4	572 5 11	311 13 4	2,799 7 4
Total establishments .	14,168 2 10	9,742 2 4	3,256 1 11	7,704 0 4	34,870 7 5
Grand total of expenditure ..	14,168 2 10	52,474 10 4	16,549 13 11	12,681 11 4	95,874 6 5

Darjeeling,
The 10*th June* 1870.

H. LEEDS,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Dr. *Annual abstract account of the cash transactions of the Forest Department, Bengal, during* 1869-70. *Cr.*

Year.	Heads of Account.	Rs. As. P.	Amount. Rs. As. P.	Year.	Heads of Account.	Rs. As. P.	Amount. Rs. As. P.
	To cash balance in hand on 1st April 1869—				By expenditure of the department—		
	Sikkim	4,502 12 4			Direction	14,168 2 10	
	Bhutan	2,470 3 3			Sikkim	52,474 10 4	
	Assam	823 10 8			Bhutan	16,549 13 11	
	To revenue received—		7,796 10 3		Assam	12,681 11 4	
	Sikkim	39,203 10 9			By remittances to state treasuries		95,874 6 5
	Bhutan	876 5 3			Sikkim	43,222 9 9	
	Assam	120 8 9			Bhutan	842 5 3	
	To remittances from state treasuries—		40,200 8 9		Assam	0 0 0	
	Direction	14,168 2 10			By repayments of deposits—		44,064 15 0
	Sikkim	58,060 3 6			Sikkim	3,199 5 6	
	Bhutan	13,661 2 0			Bhutan	500 0 0	
	Assam	12,100 0 0			Assam	0 0 0	
	To deposits—		97,989 8 4		By advances made—		3,699 5 6
	Sikkim	199 5 6			Sikkim	10,058 3 8	
	Bhutan	600 1 0			Bhutan	3,195 7 9	
	Assam	257 12 0			Assam	1,144 4 11	
	To advances recovered—		1,057 2 6				14,398 0 4
	Sikkim	7,866 3 8			By refund of revenue	.....	0 0 0
	Bhutan	3,482 0 9			By cash balance in hand on 31st March 1870—		
	Assam	557 13 9			Sikkim	877 6 6	
			11,906 2 2		Bhutan	2 1 4	
	To Mr. Mann's subscription to Uncovenanted Service Family Pension Fund		437 4 0		Assam	471 0 11	
							1,350 8 9
	Total ...		1,59,387 4 0		Total ...		1,59,387 4 0

DARJEELING,
The 10*th June* 1870.

H. LEEDS,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual statement of outstandings and liabilities of the department on account of contractors and disbursers for 1869-70.

		Department Debtor.			Department Creditor.			Balance due.	
		At commencement of year.	Recoveries in cash and value of supplies and work done during year.	At close of year.	At commencement of year.	Payments made during year.	At close of year.	To department (outstandings).	By department (liabilities).
		Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Carting timber	Sikkim ...	0 0 0	1,109 0 0	1,109 0 0	4,877 6 0	275 10 0	5,153 0 0	4,044 0 0	0 0 0
	Bhutan ...	0 0 0	113 4 4	113 4 4	80 12 11	295 3 2	376 0 1	262 11 9	0 0 0
Sawing timber	Sikkim ...	0 0 0	38 14 5	38 14 5	2,004 1 0	0 0 0	2,004 1 0	1,965 2 7	0 0 0
	Bhutan ...	0 0 0	128 4 0	128 4 0	761 4 0	137 0 0	898 4 0	770 0 0	0 0 0
Felling and floating timber ...	Sikkim ...	0 0 0	263 0 0	263 0 0	2,357 3 0	0 0 0	2,357 3 0	2,094 3 0	0 0 0
	Bhutan ...	0 0 0	1,830 0 0	1,830 0 0	5,191 11 0	980 0 0	6,171 11 0	4,341 11 0	0 0 0
Plantations	Sikkim ...	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	Bhutan ...	0 0 0	58 10 6	58 10 6	0 0 0	58 10 6	58 10 6	0 0 0	0 0 0
Sundry works	Sikkim ...	0 0 0	0 0 0	0 0 0	86 8 3	0 0 0	86 8 3	86 8 3	0 0 0
	Bhutan ...	0 0 0	442 2 8	442 2 8	0 0 0	637 2 8	637 2 8	195 0 0	0 0 0
Total ...		0 0 0	3,983 3 11	3,983 3 11	15,358 14 2	2,383 10 4	17,742 8 6	13,759 4 7	0 0 0

Darjeeling,
The 10*th June* 1870.

H. LEEDS,
Conservator of Forests, L P.

FOREST DEPARTMENT, BENGAL.

Statement of timber brought to depôts from the different Forest Divisions during 1869-70.

Name of River or Division.	Forest.	Description of timber.	Pieces.	Cubic feet.	Total of each river. Pieces.	Total of each river. Cubic feet.	Remarks.
Sikkim ...	Rayeng	Sal sleepers	908	3,089			
	Sivok	Ditto	176	599			
	Sookna	Ditto	1,763	5,999	2,847	9,687	
Bhutan ...	Monaghat	Sal logs	185	7,478			
		Karla Kumbers	258	.....			
		Sal planks	241	125			
	Dangeo	Sissoo logs	12	216			
	Ryang	Pine logs	8	195			
		Sal sleepers	14	48			
	Buxa	Sal logs	205	9,993			
		Karla Kumbers	121	.....			
		Sal gools	128	.....			
		Sal beams	7	.....	1,179	18,055	
		Total ...	.....	.....	4,026	27,742	

Darjeeling,
The 10*th June* 1870.

H. Leeds,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual timber account for 1869-70.

Particulars.		Pieces.	Total.
I.—Stock in hand at the following depôts at the commencement of the year—			
1. *At Station depôts.*			
Logs	3,155		
Sleepers	17,190		
Scantlings	10		
Saplings	2,312		
Shingles	104,000		
Karla Kumbers ...	365	127,032	
2. *At Forest depôts.*			
Logs	4,496		
Sleepers	37,774	42,270	
			169,302
II.—Timber received at Depôts from the forests—			
1. *At Station depôts.*			
Logs	185		
Planks	241		
Karla Kumbers ...	258	684	
2. *At Forest depôts.*			
Logs	225		
Sleepers	2,861		
Karla Kumbers ...	256	3,342	
			4,026
Total		.....	173,628

Particulars.		Pieces.	Total.
I.—Timber removed by purchasers from depôts—			
Logs	9		
Sleepers	12,351		
Karla Kumbers... ...	170	12,530	
II.—Timber lost and used by the depôts—			
Logs	15		
Saplings	1,826		
Karla Kumbers... ...	61		
Sleepers	766		
Shingles	16 000	18,668	
			31,198
III.—Stock in hand at the close of the year—			
1. *At Station depôts.*			
Logs	2,797		
Sleepers	21,244		
Scantlings	10		
Saplings	486		
Shingles	88,000		
Karla Kumbers... ...	851	113,388	
2. *At Forest depôts.*			
Logs	4,667		
Sleepers	23,464		
Planks	241		
Karla Kumbers... ...	370	28,742	
			142,130
Total ...		.....	173,328

Note.—On examination of last year's Sikkim statements, discrepancies have been discovered amounting to 3,088 logs and sleepers. This number of pieces has been deducted this year, which accounts for difference in balance brought forward from 1868-69.

Darjeeling,
The 10*th June* 1870.

H. Leeds,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount realized on account of the different classes of timber sold during 1869-70.

Divisions.	Number of logs sold.	Average cubical contents per log.	Amount realized on account of timber sold.	Average amount per log.	Average amount per ton (50 cubic feet.)	Remarks.
Sikkim.			Rs. As. P.	Rs. As. P.	Rs As. P.	
Sal sleepers 10′ X 10″ X 5″	12,351	3′ 4″ 10″	30,446 2 0	2 7 5	36 3 6	
Karla Kumbers ...	138	.....	50 0 0	0 5 9	0 0 0	
Bhutan.						
Pine logs	6	24′ 5″ 0	112 0 0	18 10 8	38 6 0	
Sal logs	1	16′ 0 0	24 13 3	0 0 0	77 9 4	
Sissoo logs	2	9′ 0 0	8 0 0	4 0 0	22 3 6	
Karla Kumbers ...	32	0 0 0	80 0 0	2 8 0	0 0 0	
Sal timber	.....	0 0 0	*1,350 0 0	0 0 0	37 8 0	* This is a deposit. The timber has not yet been delivered or measured.
Total ...	12,530	.....	32,070 15 3	.....	.....	
Deduct amount due but not realized during the year ...			800 0 0	.....	.....	
Add amount realized on account of former years ...			0 0 0	.....	.....	
Total shown as revenue on account of timber sales ...			†31,270 15 3	.....	.....	† Actual amount credited in annual summary of revenue is Rs. 35,824-13-3, but timber to the value of Rs. 4,553-14 has yet to be delivered.

Darjeeling,
The 10th June 1870.

H. Leeds,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount expended on account of timber received from the different Forest Divisions during 1869-70.

Name of division.	Number of logs.	Cubical contents.	Timber expenses.	Average cubical contents per log.	Average paid per ton (50 cubic feet).	Remarks.
Sikkim and Bhutan.			Rs. As. P.		Rs. As. P.	
Logs	410	17,882	4,715 11 0	43′ 7″ 4″	13 2 11	Timber expenses under A. I. Sikkim are not included, as only 2,847 sleepers were brought out from the forests during the year. The expenditure under A I. were for carting sleepers, &c., from forest depôts to Siligoree.
Sleepers	2,861	9,734	4,291 8 0	3′ 4″ 10″	22 0 8	
Planks	241	126	241 0 0	0 6″ 3″	95 10 1	
Pieces and Karla Kumbers	514	.....	1,285 0 0	.....	0 0 0	A. III and X. are taken.
Total ...	4,026	27,742	10,533 3 0	.....	.....	

Darjeeling,
The 10th June 1870.

H. Leeds,
Conservator of Forests, L. P.

FOREST DEPARTMENT, BENGAL.

Annual account of forest revenue for the year 1869-70.

	Rs.	As.	P.
Receipts	40,200	8	9
Expenditure	95,874	6	5
Deficit ...	55,673	13	8
Deduct difference between assets and liabilities at the commencement and close of the year	18,942	6	5
Nett deficit ...	36,731	7	3

NOTE.—The revenue collected on forest produce by civil officers in the Lower Provinces of Bengal amounted to Rs. 73,552-0-8, from which if the deficit above shown be deducted, a surplus of Rs. 36,820-9-5 is nett revenue from the forests of the Lower Provinces.

Detail of difference between assets and liabilities at the commencement and close of the year.

	At the commencement of the year.			At the close of the year.			Difference. In favor of the year.			Difference. Against the year.		
	Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.
Value of timber ...	2,70,597	0	0	2,91,441	0	0	20,844	0	0	0	0	0
Value of elephants and buffaloes.	7,525	0	0	7,223	0	0	0	0	0	302	0	0
Outstanding on account of sales to Darjeeling Municipality.	318	8	5	318	8	5	0	0	0	0	0	0
Excess payments to contractors.	15,358	14	2	13,759	4	7	0	0	0	1,599	9	7
Total assets ...	2,93,799	6	7	3,12,741	13	0	20,844	0	0	1,901	9	7
Deduct liabilities ...	.....			.....			1,901	9	7	.....		
Balance ...	.....			.....			18,942	6	5	.....		

DARJEELING,
The 10*th June* 1870.

H. LEEDS,
Conservator of Forests, L. P.

Memorandum on Forest Survey in the Assam Division during the year 1869-70.

THE forest operations in the Assam division during the year 1869-70 consisted chiefly of inspection of forests, which extended over the following districts :—

1. The Luckimpore district.
2. The Seebsaugor district.
3. The Naga Hill district.
4. The Nowgong district.
5. The Khasi and Jynteah Hills.

Luckimpore district.

The timber forests in the Luckimpore district are more valuable by their extent and the excellent water-ways prevailing, than on account of the superiority of the timber they produce.

They may be divided into two main ranges *viz.*

I.—Forests within the mouzahs, or on lands over which revenue control is exercised by the civil authorities.

II.—Forests beyond the mouzahs, or such as are lying beyond the police outposts, and can supply large quantities of timber to meet local wants, but in which it would not be advisable, for political reasons, to carry out any conservancy measures.

The forests within the mouzahs are the following :—

Forest within the "mouzah."

1*st.*—The forests on the left bank of the Brahmapootra between Saikwah Ghaut, opposite Suddya and Debroomook. These forests are very inferior, partly on account of the poor soil on which they grow, and partly on account of the constant drain there has been on them for many years past for the supply of the Upper Assam Tea Co's Saw Mill, and for small posts and firewood, &c., for the station of Debrooghur, which has been obtained chiefly from these forests; and also by the cutting of small canoes, where trees of sufficient size were left, which latter, however, are now rare, and no canoes, that hold more than thirty maunds are procured from these forests at present. The better kinds of timber in these forests are sam, poma, titasappa, ajhar, gunserai, hilika, parella, roghoo, ghoria, booal, beh, mypook, simul and hollach. Opposite Pobba stockade some scattered sissoo trees are left on the bank of the Brahmapootra. All large trees however, which were there formerly of excellent growth and quality have been cut and removed for building and other purposes to Debrooghur.

All timber from these forests is brought down the Brahmapootra, and through the Meeklaharrowa Sootee to the station of Debrooghur. The great convenience with which forest produce can be removed from there to Debrooghur, and the deterioration of these forests, render protection of them imperative.

2*nd.*—The forests on the banks of the Debroonuddy.

These have also been much worked for the supply of the station of Debrooghur; but superior forests are left in many parts, and are particularly good on the Upper Debroo at Pingreeghur, and near the old village of Kochoa.

These forests on the left bank of the Debroonuddy stretch right across to the Upper Deehing, over an area of some twenty miles in width.

The forest on the right bank of the river, towards the Noa Deehing are more limited and inferior.

The better kinds of timber in these forests are the following :—sam, poma, titasappa, nahor, ajhar, gunserai, bunjamoo, uriam, bola, koroie, hingari, hilika, bogapoma, parella, raghoo, ghoria, booal, beh, bunam, mypook, simul and hollach.

The present supply of timber for the Upper Assam Tea Company's Saw Mills is procured from these forests, and converted chiefly for their own use.

This Company is at present felling and removing timber from the Government forests, on the understanding that they are to pay whatever price the Forest Department may fix hereafter, but without any limitation as to size, quantity, or quality of the same, or any control over their operations by the forest department.

Canoes up to a size sufficient to carry sixty maunds are cut chiefly out of sam, gunserai, poma, titasappa, hollach and simul.

All timber is floated down the Debroonuddy.

3rd.—The forests on the left bank of the Brahmapootra between the Debroomook, and the Baree Dehingmook.

These forests extend over an area of about fifteen miles in length, and are of two miles average width.

They have been worked where they were most accessible, especially in the immediate neighbourhood of the Brahmapootra, (the Larooajhan and Gaboorjhan,) but are still most valuable, and contain large quantities of timber of the same kinds as are found in the forests on the banks of the Debroonuddy.

Only small canoes are cut by villagers near these forests, but not for sale, as a rule.

All timber from these forests is removed by the Larooajhan and Gaboorjhan to the Brahmapootra.

4th.—The forests on the Lower Deehing river, and its tributaries from Deehingmook, up to Jeypore.

The tributaries flowing into the Lower Deehing are the Sessa, and Tingrai nuddy, Pihing nuddy and the Digbay nuddy, on the right bank, and the Desam nuddy and Kathanjan on the left bank.

These forests, roughly stated, extend on the left bank over a tract of about 40 miles in length and an average six miles in width, whilst on the right bank they are about 40 miles in length and four miles in width.

On account of their low position and frequent inundations, ajhar (lagerstrœmia æginas the most valuable timber in upper Assam, thrives admirably, forming high and regular stem) as compared with those growing on the dry lands, in Lower Assam. It produces itself very fast in these forests, and there can be no doubt with an ordinary amount of care and some assistance to the seedlings, in the way of clearing of the useless scrub surrounding them, these forests may be made a great source of supply of this excellent timber, and on account of the extraordinary facilities existing for the transport of timbers by water, become also a great source of revenue to the State.

Other kinds of timber, such as sam, titasappa, nahor, gunserai, jamoo, uriam, korai, phorlsappa, hingaree, hilika, parella, roghoo, gohara, booal, barthekra, beh, bunchen, mypook, kochan, simul, and hollach are also met with frequently.

Poma is exceptionally fine on the bank of the Sessa nuddy, as might have been expected, It has been very much worked for the cutting of canoes and the supply of timber to the Deehing Saw Mill, and few first class trees are left any where near the rivers; but vast quantities of timber are still in these forests, some distance from the rivers, and saplings and seedlings are extremely abundant.

5th.—The forests on the upper Deehing river, and its tributaries from Tezpore to the junction of the Deehing river and Teerap nuddy.

The tributaries flowing into the upper Deehing are, the Jungloo nuddy, Pawai nuddy, and Booree Beel nuddy on the right bank, and the Teerap nuddy, Makoom nuddy, and Namsang nuddy on the left bank.

These forests extend on the right bank over a tract of about fifteen miles in length, and an average width of eight miles; on the left bank over a tract of the same length by sixteen miles in width.

On the Tippun hills the forest is superior, and has escaped the general fate on account of the greater difficulties of removing the timber; but the forest continues also east of these hills, along the right bank of the Deehing, up to about seven miles beyond the forest of Makoom, after which the country becomes more open, chiefly covered with high grass and a few trees of inferior kinds scattered about through the grass not deserving the name of forest.

On the left bank the forests are best in the neighbourhood of the hills, which extend up to the Deehing near the Namsang and Makoom nuddies. In the intervening tracts the forests are inferior, and in some places too far from the river to be worked with advantage at present.

The best kinds of timber in these forests are sam, poma, titasappa, nahor, ajhar, gunserai, jamoo, uriam, naga, beh, meekai, korai, hingoree, hilika, parella raghoo, goparah hallang, bunchen, mypook, kochan, simul, and hollach. Seedlings of sam are very abundant all through the forest, although large trees are rare; and since sam prefers the high ground and these forests are so conveniently situated as regards water-way, endeavours should be made to facilitate the growing up of these seedlings of this excellent timber tree, by admitting more light and air in those parts where the dense undergrowth or useless kinds prevent them from developing themselves into healthy trees, by which results might be obtained nearly equal to plantations without excessive expenditure.

Operations of this kind are more certain to prove remunerative in the Deehing forests than any where else in Assam, and without them the forest must gradually deteriorate, as a matter of course, when the better kinds of trees are removed, and thereby more space provided for the more rapid development of the useless kinds and dense undergrowth.

Exceptionally fine are the meekai (Dipterocarpus species) and hallang (Dipterocarpus pilosa) forests on the Upper Dehing.

These forests, like those on the Lower Deehing, have been worked for the supply of the Deehing Saw Mill and for the cutting out of canoes, as the facilities for floating made operations of this kind remunerative, and up to the present year no restrictions were exercised.

The cutting out of canoes is about as great a waste of timber as exists in Assam, and every endeavour should be made to make the natives take to boat building to economize timber.

Excellent boats are in this way already constructed by the Deehing Saw Mill (*sic*) of planks of much the same shape as the canoes, by which a great saving of timber is effected.

All timber from these forests is floated down the Deehing river to the Brahmapootra.

A Government timber depôt near the exit of the Booree Deehing for the supply of timber to the Deehing Saw Mill, a well established company, which is able to convert 120,000 cubic feet of timber in the year with its present machinery, and for the local supply of the province in general, will be one of the first desiderata for the forest department to supply.

6. The forest on the right bank of the Dehsang nuddy and its tributaries, which lie within the Luckimpore district.

The latter are the Demoo nuddy and the Deeraee nuddy.

These forests extend over an area of about thirty miles in length and four miles average width, and are in every respect very similar to those on the Lower Deehing.

They contain the same kinds of timber; and on the Deomook particularly fine ajhar.

They have been less worked than the Deehing forests, as there has been no special demand any where near these rivers or the exit of the Dehsang.

Forests beyond the mouzahs—Luckimpore.

The forests beyond the mouzahs, or those in which no conservancy measures could be carried out, were not inspected; but all the information that could be obtained by enquiry, was procured whenever practicable or opportunity offered. They are the following:—

1. The forests running along the foot of the Himalayas, on the north or right bank of the Brahmapootra, from the Booree Sootee eastward as far as the Brahmakoond—a distance of about eighty miles in length by fifteen miles average width.

These forests contain, according to the statements of the Abors who live in or near them, and the Meerees, who chiefly inhabit the banks of the rivers draining them, the same kinds of timbers as those forests already enumerated.

They are drained by the following rivers:—The Gagha nuddy, Debong river, Dikrung nuddy, Koondil and Diphoo panee and Digaroo river.

2. The forests running along the foot of the Patkye mountain, on the south or left bank of the Brahmapootra, between the Brahmakoond and the Booree Deehing river, and covering an area of about thirty miles in length by ten miles width. They contain much the same kinds of timber as the forests along the foot of the Himalyas, but are otherwise inferior on account of cultivation having more encroached on them than on the north side of the Brahmapootra. They are drained by the Tengah panee and the Noa Dehing river, and their tributaries, by which all the timber from them is brought to the Brahmapootra.

The working out of large sized trees from the forests beyond the mouzahs might prove to the natives, who live near them, a welcome source for earning a livelihood, and enable the forest department to meet all demands without excessive working of the better forests within the mouzahs.

Besides these there are large quantities of useful timber, such as simul and raghoo, to be procured from trees scattered along the banks of the Brahmapootra; and the different sootees, by which also the timber supply of the province could be economized, and which, as well as the forests beyond the mouzahs, might advantageously be worked by permit-holders; and by these means a considerable revenue be ensured to the State; whilst by the conditions of the permit granted the felling of under-sized timber could, at least to a great extent, be prevented, if no other and better conservancy measures are practicable at present.

The people, instead of being restricted to inferior kinds of trees, are limited only to small sized trees, which restriction does more harm than good.

Soom forests in Luckimpore—silk manufactured.

Besides the timber forests in the Luckimpore district there are most valuable soom forests on the south side of the Brahmapootra, already noticed in last year's report, which are deserving the greatest care and attention, and better control than they receive at present, as encroachments are frequent and the manufacture of the moogah silk is one of the most profitable occupations of the inhabitants of the Luckimpore district, the latter being particularly favourable to the growth of the soom tree; neither can there be any doubt that on account of the durability of the silk the trade must develope itself soon to a greater extent than at present.

They are not equal to the soom forests in north Luckimpore, but still very extensive, and the trees thriving, especially in the country between the Debroo nuddy and the Booree Deehing nuddy.

A large revenue is still realized from the caoutchouc mehals in the Luckimpore district, but the greater portion of the caoutchouc, on which this revenue is realized is imported from foreign territory, the trees in the Government forests being nearly all exhausted.

No conservancy establishment was employed in this district during the year.

Forests in the Seebsaugor district.

The timber forests in the Seebsaugor district are most of them very scattered, and large portions of them have been taken up for tea cultivation.

The more compact ones are the following :—

1*st.*—The forests on the banks of the Dehsang nuddy and its tributaries, which lie within the Seebsaugor district.

The better kinds of timber in those forests are: sam, poma, titasappa, nahor, ajhar, jamoo, korai, hilika, amaree, goharah, kochan, and simul.

These forests have only been worked for the making of canoes and the local supply of house posts, domestic and farming implements, such as mortars and ploughs, &c., and none of the timber has been exported out of the district. Considerable portions, however, have been taken up for tea cultivation.

The Dehsang nuddy and its larger tributaries are well suited for floating operations.

2*nd.*—The forests on the left bank of the Brahmapootra, between the Dechingmook and the Jhanjeemook.

These are inferior and contain the better kinds of timber in smaller proportions, but are worked for the cutting out of small canoes, house-posts, and firewood, for the steamers, and are well worth some care and attention to keep up these supplies, and to economize better forests thereby.

3*rd.*—That portion of the namber forest on the left bank of the Dhunsiri river, which is situated within the Seebsaugor district, and extends over about 25 square miles.

This is a superior forest, containing large quantities of the better kinds of timber, such as sam, mopa, nahor, ajhar, gunserai, jamoo, uriam, hingoree, hilika, parella, raghoo, gohorah, bunchen, kochan, simul, and hollach.

The nahor trees are particularly fine and abundant.

This forest has been chiefly worked for the supply of the station of Golaghât, and one or two tea gardens were started in it, but have been abandoned.

The Dhunsiri river presents excellent facilities for floating timber to Golaghât and the Brahmapootra.

The superiority of this forest, and the absence of villages or any cultivation in it, render the reserving of it advisable and comparatively easy.

4*th.*—The forests on the left bank of the Kalleeanee river.

These resemble in every respect the last named forest, and are particularly noteworthy for the nahor they produce.

No timber has been exported from these forests.

Besides these more compact timber forests there are numerous tracts of valuable forests scattered through the district, most of which have been taken up for tea cultivation, and will supply the wants for building material and charcoal to the owners, if more care is bestowed on these lands, than has been done hitherto, which will most probably be one of the beneficial results of the introduction of forest conservancy in this province.

Forests so far exhausted that plantations are being formed for the purpose of obtaining wood for charcoal!

The forests near the Assam Company's gardens, on the upper Dikho river, have actually been so far exhausted that the planting of forests for the manufacture of charcoal is at present under consideration by that Company.

Of many of these forests those portions not taken up for tea cultivation, or such as have again been thrown up, or may be abandoned in future, should be strictly conserved,—a measure absolutely necessary in a district in which so little forest is left, and the population is so large,—if for no other reason then the supply of local wants only.

The better of these forest tracts are the following:—The forest on the left bank of the Jhanjee nuddy, near the Dhodur Allee; the Kurkanee forests on the Kokadanga nuddy; the Durriahabee forests on the Durria nuddy; and the Dukhinhengera forest on the Dukhinhengera nuddy.

In the neighbourhood of the Bur Timon nuddy there are three small patches of sâl, containg 40 or 50 trees each, which are said to have been planted by one of the rajah's ministers and the original plants are said to have been brought from Kamroop.

This would account for these isolated patches of sâl so much further east than sâl is met with otherwise in the province.

They are naturally reproducing themselves and spreading, and might be worth reserving if for experimental purposes only.

Soom forests in Seebsaugor.

The soom forests in the Seebsaugor district are also extensive and valuable, and deserving of as much care as those in the Luckimpore district.

The caoutachouc tree is comparatively rare, and no revenue is realized from this source in the Seebsaugor district.

No conservancy establishment was employed for this district during the year.

Forests in the Naga Hills.

The timber forests in the Naga Hill district are some of the most valuable forests in the province, being compact ever-green forests, with a very larger proportion of valuable timber trees in them.

They may be enumerated as follows:—

1*st*.—The Dayang forest south of Golaghât, and between the Dayang and the Dhunsiri rivers, extending over an area of about thirty-five miles in length by eight miles in width.

The better kinds of timber in this forest are the following:—Sam, poma, titasappa, nahor, ajhar, gunserai, jamoo, uriam, korai, hingoree, hilika, parella, raghoo, gohurah, bunchen, kochan, simul, and hollach.

The best kinds such as sam, ajhar, and nahor, are met with in fair proportion and of excellent growth.

Little or no timber was felled in this forest, except for canoes, which were floated down either by the Dayang or the Dhunsiri river, and disposed of at Golaghat or near the Brahmapootra. No trustworthy information, as to the number of canoes cut out formerly in this forest, could be obtained.

2. The Dhunsiri forest immediately west of the former and on the left bank of the Dhunsiri nuddy, and between the Seebsaugor boundary north and the Naga Hills south.

It extends over an area of about forty miles in length and eight miles average width, and produces the same kinds of timber as the Dayang forest.

With the exception of the cutting out of canoes, no timber has been exported from these forests, but there can be no doubt that portions of it have been farmed in former years, especially in the neighbourhood of Deemapore. At present there are no villages in this forest.

The Dhunsiri is well suited for floating operations, and during the rains timber might also be brought out by the Namber nuddy, the Deopang and the Hurreeoojhan. This forest has been reserved for the last year, and a forest moonshee who was kept in charge of it to prevent illegal felling of timber, was lately superseded by a forest ranger.

3. The forests on the right bank of the Kaleeana river, on the banks of the Doeegooroong river, extending over an area of about twenty miles in length by eight miles in width.

Joom cultivation destroying the Dhunsiri forest.

They are very similar to the Dhunsiri forests, and no timber has been exported from them, except in the shape of canoes; but the Meechies and other tribes are destroying large portions of them by joom cultivation, which should be excluded from such lands at least, which on

account of the superior timber they produce, the quantity contained, uncertain area, or the particular facilities there exist by their proximity to rivers for floating timber from these forests are worth conservancy. Such a measure is most desirable where it can be carried out without inflicting real hardships on the people; for the reason, that valuable timber trees furnish more charcoal and ashes to manure their lands than scrub, and inferior jungle can hardly be considered sufficient to prevent some restriction of this savage mode of cultivation, for which there is no excuse on flat lands.

4. The forests on the upper Jamoona nuddy, above Mahing Dijooah.

This is inferior to the other forests in the district, and many of the low hills adjoining it have been entirely cleared by joom cultivation; but there still remains a considerable area, of about sixteen miles in length by eight miles in width, covered with forest, from which joom cultivation should also be excluded.

The forests on the Naga Hills, and along the foot of these hills to a distance of one or two miles from them, are and have been continually joomed, and it would not be advisable, for political reasons, to interfere in any way with these cultivations, even if the forests were more valuable than they are. As it is they have but very little servicable timber left in them.

The undulating ground and low hills on the right bank of the Jamoona, below Mahing Dijooah, contain no forest; but a few better trees, such as parella, serus, and simul, are scattered through the high grass, over great areas, and might be worked up into planking for tea boxes if required

Forests in Nowgong district.

The forests in the Nowgong district are of little importance, and proved on inspection nothing like the forests anticipated.

The better forests are the sâl forests, and these are very inferior containing but very small trees and saplings, the few larger trees there ever had been having been worked out.

The sâl forests inspected are the following:—

1*st*.—The Dahoka sâl forest on and along the foot of the southern slopes of the Meekir hills near Dahoka.

These forests occupy the slopes of the Meekir hills, and the slightly elevated ground along the foot of them, being largely mixed with other and inferior trees and cane brakes.

2*nd*.—The Collona sâl forests near the Collona nuddy, about twelve miles south of Burthul, near the foot of the eastern slopes of the Jynteah hills.

These consist of only a few patches of sâl, and nearly all the trees have a stunted appearance, being more or less covered with climbers; situated on the southern slopes of these hills, adjoining the Garrow Hills and from their inaccessibility and inferiority of the timber they produce, not worth reserving.

The forests on the southern slopes are as follows:—the Nasteng, Langree, Bhawal, Moharam, Malai, Chamut and Dowra forests; and those on the north side of the watershed are the Jeerang and the Mandum forests.

Forests leased by Government on certain conditions.

With the exception of the last named, they have been leased in perpetuity by Government on the condition of the respective chiefs receiving half of the revenue derived from them, but except from the Jeerang forest, no revenue has as yet been realized from them for the above reasons.

The privilege of felling timber in the Jeerang forest sold for three years.

The privilege of felling timber in the Jeerang forest has been sold by Government for three years, from April 1868 to April 1871, on the fixed annual rent of Rs. 150, to Cham Rai, Seim of Nunklow, without any restrictions whatever.

Revenue derived from forest devoted to maintenance of the Seim's family.

The revenue derived from the Mandum forest is entirely devoted to the maintenance of the Seim's family, and Government receives no portion of it.

The forests on the Jynteah hills are also very few, much having been cut down for joom cultivation within the last ten years; but as the kinds of timbers which grew on them were inferior, and the forests very inaccessible, joom cultivation has not done so much harm here as in other parts of the province.

Forests in the Jynteah Hills.

The forests left are the Nurpoo forest, Nangle forest, Lackadang forest, and Batoo forest, in the neighbourhood of the Kopeela nuddy, and above the falls from where, as before stated, the working out of timber should not be attempted. From the scattered sâl forests on the northern slopes of these hills, although very inferior, jooming should, however, be excluded.

In the neighbourhood of Shillong pine forests of *pinus langifolia* are very abundant, and at present there is as much timber as the station requires; but as they are all the property of private people, and no care is bestowed by them on the preservation of these forests, some measures ought to be adopted to secure a permanent timber supply for the station of Shillong. The land belonging to the station of Shillong extends over seven square miles, and much of this is covered with a forest of pines and great care should be taken of them and the climbers.

Pine forests in Shillong.

3rd.—The Baleecochee sâl forest near the village of Baleecochee, at the foot of the northern slopes of the Jynteah hills. This consists of a small patch of very scattered sâl sapling only, and the greater portion of it lies within the boundary of an abandoned tea plantation.

Sâl forests on nothern slopes of hills.

4th.—The Kholahaut sâl forest west of Kholahaut, at the foot of the nothern slopes of the Jynteah hills.

This is about one and a half mile in length by a mile in width, and the trees are of some what better growth. It evidently has produced formerly some first and second class trees; but these have all been felled and removed for bridges on the Nowgong road and other works.

5th.—The Amleeghaut sâl forest east of Amleeghaut, at the foot of the northern slopes of the Jynteah Hills.

This consists of two small patches of very inferior sâl saplings much mixed with useless trees and scrub.

Besides the sâl forests in the Nowgong district, there is a mixed forest south-east and north-west of Singeemaree, which, however, is also inferior, large portions of it being occupied by useless trees, such as the aodal and bajeeah. The better timber trees in this forest are ajhar, poma, jamoo, gomaree, parella, and kochan. Ajhar is chiefly growing along the margin of the numerous small bheels intervening in the forests, and although neither high nor straight, is otherwise of vigorous growth.

The forests on both banks of the Kapeelee nuddy have been entirely destroyed by joom cultivation, and no forest is left anywhere, except above the falls, from where the working out of timber could not be attempted, since the falls extend over a couple of miles and are too precipitous to allow floating of timber; besides which the best kinds of timber to be had, such as sonaroo, and Gomaree, would not make operations of this kind remunerative.

Soom forests there are none in the Nowgong district, and the revenue realized from caoutchouc must be chiefly from imported gum, as the tree producing it is very rare.

The forests on the Khasi hills are all the property of the respective Rajahs in these hills.

Forests in Khasi hills—all the property of local Rajahs.

The tracts which still contain forests are very few, and fires, which are most destructive here, have been kept out of them as much as practicable, but they should be extended by the scattering of seed, by which excellent compact forests could be got up in a very short time and without much expense, as the young pines, even without being sown, spring up most profusely in every direction.

The Public Works Department paid formerly 1 Rc. per cubic foot of timber all round, but it can be procured for considerably less at present.

Value of fire-wood in the station.

Fire-wood is sold in the station at the rate of seven maunds per rupee. For imperial purposes, and conservancy, the improvement of these forests would not be advisable, as they are too inaccessible and the timber too inferior to make exportation remunerative.

A few valuation surveys were made in the Deching, Dhunsiri, Jamoona, Nowgong, and Khasi Hill forests, which, however, do not as yet furnish sufficient data by which to calculate the growing material in these forests.

Felling operations.

Felling operations were commenced in the Upper Deching forests and the Namber forests, but the usual difficulty of procuring labour, which presents itself at the beginning of such operations, has prevented much being done this season.

An experimental teak plantation of one acre was started at Makoon on the Upper Deching; and considering the inferiority of the seed and the lateness in the season when it arrived, this has succeeded very well, but 50 per cent vacancies exist, which will be filled up early this season.

One forest moonshee and two forest watchers were kept in the Gowalpara district, two forest watchers in the Kamroop, and two in the Durrung district, who, on the whole, have done as well as their limited authority permitted.

Increased powers to the conservancy establishments and a better definition of their duties, than can be furnished them at present, will no doubt enable an increased establishment to protect the forests more effectually during the succeeding year.

The Namber forest remains as yet the only reserve forest in the province of Assam.

(*RESOLUTION.*)

REVENUE DEPARTMENT.

FORESTS.

Fort William, the 12*th December* 1870.

READ the progress report of the forest administration of Bengal for the year 1869-70.

Inspection of forests.—Section 1, paragraphs 1 to 10, and assistant conservator's memorandum.

1. During the year inspection of the forests in the following districts of the Assam division was continued:—

Luckimpore.
Seebsagur.
Nowgong.
Naga Hills.
Khasi and Jynteah Hills.

2. The estimated area of valuable forest-covered land in Assam, so far as it can at present be ascertained, is 4,000 square miles. The value of these forests, however, varies considerably—from those in the Naga Hills, many of which are under reserve and are rich in timber, to those in the Nowgong district, which are not only inferior in quality, but have suffered much from "jooming" and excessive denudation.

3. *Luckimpore.*—The Government forests in this district are divided into two groups. First, those upon lands within the jurisdiction of the civil authorities, in which conservancy arrangements have been introduced. Second, those beyond the police outposts, and in which, though within the boundaries of British territory, for political or other reasons, it is desirable for the present to abstain from interference. In both localities the timber forests, though not of inferior quality, are of vast extent, and large facilities exist for working the forests from the excellence of the water communications which prevail.

4. Of the first group of forests, viz., those described as "within the mouzahs," the following are the principal:—

I. The forests on the left bank of the Brahmapootra between Saikwa ghât and Debroomook. The timber, though reported to be of inferior quality, has been very extensively worked. The facilities of water communication with Debrooghur, and the large demands of that station, have combined to effect the deterioration of these forests, and the closer attention of the department is necessary for the introduction of a careful conservancy.

II. The forests on the Debroo nuddy. These forests have also been much worked, and especially for the supply of timber for the upper Assam tea company's saw mills. In many places the timber is of superior quality.

III. The forests on the left bank of the Brahmapootra between the Debroomook and the Bara Dehingmook, extending over an area of about 15 miles in length and 2 miles in width. The timber is very valuable, but has only been worked in the immediate neighbourhood of the rivers Larooajhan and Gaboorjhan in places accessible to the villagers for their own use.

IV. The forests on the lower Dehing river from Dehingmook up to Jeypore, covering an area of about 560 square miles. The Deehing saw mill company's operations have reached to these forests, which contain a large supply of the most excellent timber in upper Assam, capable with care of very large extension, and possessing great facilities of transport by water.

V. The forests on the upper Deehing river and its tributaries from Tezpore to the junction of the Dehing and Teerap Nuddy, extending over an area of

120 square miles. The best portions of these forests have remained untouched from the difficulties of removing the timber, though it is noted from the assistant conservator's report that here, as on the lower Dehing, the Dehing saw mill company have been extensively employed without restriction or supervision.

VI. The forests on the right bank of the Dehsang nuddy, covering an area of about 30 miles in length and 4 miles in width. In the absence of any special demand in the neighbourhood, this tract has been less worked.

5. All these forests contain most of the kinds of wood prevalent in Assam, and in places are exceptionally rich in valuable timber. The report of the assistant conservator gives a full account of the different varieties to be found in the different forests, the natural facilities for the transport of the produce, and the necessity which exists for more careful protection with a view to the development of these extensive sources of revenue to the state. But the Lieutenant-Governor cannot fail to notice that the operations of the department have brought to light the unrestricted occupation by different private companies of tracts of forest-covered land for the supply of timber for their own uses. Thus, the upper Assam tea company's saw mill is in active employment in the neighbourhood of Deebrooghur; the Deching saw mill company is working the "exceptionally fine poma forests on the Sessa nuddy," and other forest tracts on the upper and lower Dehing: and, according to the assistant conservator, "up to the present year no restrictions have been exercised" by the department as regards their proceedings. It appears to the Lieutenant-Governor that these statements demand the attention of the conservator. In May last the Government, on the recommendation of the conservator, sanctioned an arrangement between the forest department and the north-east saw mills company for cutting timber within certain limits in the Assam forests. Rules were framed to prevent unreasonable felling to the deterioration of the forests; higher charges were laid down for the use of the more valuable trees; and the arrangement was adopted that no timber should be used by the company until marked and passed by the forest department. Similar regulations are required for the prevention of unnecessary waste of the Government forests in other places where such companies are established; for, while the Lieutenant-Governor fully recognises the value of such agencies for the supply of timber to meet all local wants in Assam, it cannot be permitted that the system hitherto in force of uncontrolled use of the State forests by private companies should continue.

6. In the forests beyond the mouzahs, no conservancy arrangements have yet been enforced, nor indeed has inspection even been effected. But general information points to the probability of their containing the same kinds of timber as the forests which have been explored, and possessing easy means of transport for their produce in the numerous water channels communicating with the Brahmapootra. It has been suggested, as a preliminary to the introduction of regular conservancy, that these forests might be advantageously worked to a profit by holders of permits from the forest department. The subject is one which the conservator may take into consideration; but the Lieutenant-Governor desires that there may be no interference with the people occupying tracts beyond the direct control of the civil authorities, unless with the previous consent of the commissioner of the division.

7. It is noted that soom forests of great value are found in Luckimpore, on the south side of the Brahmapootra. Care and attention are undoubtedly necessary to promote the growth of these trees, for their importance in rearing silkworms cannot be exaggerated as long as the manufacture of silk continues to be one of the most profitable occupations of the inhabitants of the district.

8. The Lieutenant-Governor would wish for some explanation of the assistant conservator's statement in page 22 of the report, that "a large revenue is still realized from the caoutchouc mehals in Luckimpore, but the greater portion of the caoutchouc on which the revenue is realized is imported from foreign territory."

9. *Seebsagur.*—The forests are reported to be very much scattered, but withal of a superior description, though not so generally rich as those of the Luckimpore district; the more important tracts being those on the Dehing nuddy, between the Dehingmook and Jhangeemook, that portion of the Nambur forests on the left bank of the Dhunsiri river, and those on the left bank of the Kullanee river. Considerable portions of these, as well as of other tracts of valuable forests scattered through the district, are said to have been taken up for tea cultivation.

10. It is reported that many of the forests near the Assam company's gardens are so far exhausted, that plantations are being formed for the purpose of obtaining wood for charcoal, and the assistant conservator has suggested the introduction of conservancy measures into such portions as have not been taken up for tea cultivation, or such as have again been thrown up, or may be abandoned in future. The Lieutenant-Governor hopes that the conservator will give his best attention to this suggestion.

11. *Naga Hills.*—These forests cover 1,288 square miles, and are some of the most valuable in Assam, being compact ever-green forests with a very large proportion of valuable timber trees in them. They are enumerated as the Doyang, Dhunsiri, and Kullanee; the second being reserved and placed in charge of a forest watcher for protective purposes. It is observed that large portions of the Kullanee forests are destroyed by joom cultivation. Measures should be attempted to exclude such cultivation from the midst of valuable timber forests, in which the introduction of a system of forest conservancy is desirable. The attention of the commissioner will be called to the subject.

12. *Nowgong.*—Here it appears that the predominating forests are of sâl, but are of little importance and contain very stunted trees and saplings only. Those marginally cited have undergone inspection, but, from the inferiority of the timber and the difficulty of access to the forests, no conservancy measures are contemplated.

Dahoka sâl forest.
Collona ditto.

13. *Khasi and Jynteah Hills.*—It is reported that most of the forests on the southern slopes of these Jynteah hills have been leased by Government from certain chiefs, and that the privilege of felling timber in the Jeerang forest was sold by Government for three years, from April 1868 to April 1871, on the fixed annual rent of Rs. 150, to Chand Rai Seim of Nunklow, and that the revenue derived from the Mandum forest is entirely devoted to the maintenance of the Seim's family. It does not appear that there has been any correspondence on the subject between Government and the local officers, by whom, in connection with the forest department, it is presumed the settlement of these matters has been concluded. The Lieutenant-Governor desires to be supplied with a copy of any correspondence that may have taken place shewing the precise conditions on which the sale of the forests in question was effected. The absence of all restriction in the cutting of timber in the Jeerang forest, even for the limited period of three years, seems an undesirable arrangement.

14. Extensive forests of the *pinus longifolia* are to be found adjacent to Shillong; but the Lieutenant-Governor regrets to learn of their indifferent treatment by those who own them. Government is unable to interfere in the management of these private forests, but the commissioner's attention will be called to the remarks regarding the condition of the forests within the station.

15. The suggestion that the extension of the tracts of pine forests in which the trees have suffered from jungle fires might be secured by scattering seed, is perhaps deserving of experiment.

16. The assistant conservator urges that increased powers should be given to the conservancy establishments, and a better definition of their duties clearly determined. The conservator is aware that the new forest bill proposed by

Mr. Brandis, in amendment of Act VII. of 1867, is at present before the legislative council of the Government of India, and fully meets the requirements of forest conservancy in India.

17. The issue of the rules under the present law which has been determined upon since the close of the year under notice will also increase the facilities of administration.

Reserves —Section 2, paragraph 15

18. The Lieutenant-Governor desires to be informed whence the statistical statement for the Eastern and Western Dooars was obtained. The commissioner's report of the late settlement, which has been submitted to Government, does not contain the particulars.

Paragraphs 16 and 17.

19. Satisfactory progress has been made in carrying out the preliminary demarcation of reserved forests in the Sikkim and Bhútan divisions. The Lieutenant-Governor looks for the completion of this work in Bhútan during the next season, when, it is hoped, the demarcation of the reserves in Assam also will be commenced. The care of the departmental officers will be required in maintaining the boundary marks laid down. A regular valuation survey of timber in all the forest reserves in Assam, and in the Sikkim and Bhútan divisions, should certainly be commenced at the same time. The department is sufficiently strong in both these divisions to carry out these works. The plan of selecting certain tracts, and of dividing them into blocks for survey purposes, is probably the best method of effecting this, for operations will thus be concentrated.

Plantations.—Section 3, paragraphs 18 and 19.

20. The area planted out with oak, magnolia and walnut, has increased by 180 acres. The raising of a potato crop together with the young trees was recommended by the officiating conservator as an experimental measure to check the jungle undergrowth. The proposal was considered to be judicious, and it is to be regretted that the experiment is not likely to succeed owing to the unsuitability of the crop.

Paragraphs 20 to 23.

21. Success has in a great measure attended the experimental teak plantations which were started with the object of obtaining data for future operations. The Lieutenant-Governor approves of the adoption of the plan of operations proposed for securing further plantations, and which appears to have worked satisfactorily in Burmah. The teak plantations, if efficiently worked, will doubtless hereafter be fruitful of considerable revenue.

Yield of the forests.—Section 4, paragraph 25.

22. The total outturn of timber from the forests of the Sikkim and Bhútan divisions during the year was extremely small, consisting of 1,165 logs and 2,861 sleepers.

Paragraph 26.

23. The considerable waste in the Deling and Dhunsiri forests, which is noted in this paragraph, is attributed to the difficulties encountered in removing the timber. These difficulties, it seems to the Lieutenant-Governor, might have been foreseen before the timber was felled. His Honor trusts that means will be found to dispose of the wood profitably by sale or utilization before it deteriorates.

Paragraph 28.

24. The difficulties in extracting timber from the forests above the rapids of the Teesta in Sikkim appear at present to be insuperable, and no attempt should be made to obtain supplies thence until some improved means of transport has been matured.

Paragraphs 31 and 32.

25. The proposals contained in these paragraphs, that timely notice should be given of yearly requirements of timber, will be forwarded for consideration in the public works department.

26. The Lieutenant-Governor will be glad to learn what is now being done towards the removal from the Great Rungeet of the pine logs extracted from the forests of the rajah of Sikkim.

Paragraphs 33 and 34.

27. The assistant conservator's action was most hasty and unauthorized in the matter of the purchase of the sâl logs from the Sikkim rajah. He should be strictly enjoined not to bring any such transactions to conclusion in future without reference to the conservator.

28. The conservator reports that the work of extracting timber from the forests in Bengal has been carried on under four different systems, viz., by the agency of permit-holders, of Government, of petty contractors, and of extra establishments, some of these having met with the approval of Government, while others were discountenanced or forbidden. It is not known to what Government orders reference is here made; but it seems from the statements made by the conservator in paragraphs 41 to 45, that, in the present constitution of the department, which is weak in numbers compared with the wide area of forests to be supervised, the permit system is for the present at least the best system for working the forests. It would appear to be less expensive, and—considering the inadequacy of the forest establishments, whose attention can more advantageously be devoted to other important duties—to be as effective as circumstances will permit for the objects in view. Care, of course, should be taken that permits are only granted to men of substance and respectability.

Paragraphs 36 to 46.

29. The conservator observes that he should not be debarred, on his own responsibility, from employing extra establishment for the performance of such work as cannot be dispensed with, and which the regular establishment is unable at the time to undertake. A reference to the correspondence entered in the margin will show that the conservator has already been invested with discretionary power to employ small temporary establishments, not exceeding Rs. 50, in cases of real urgency, on the distinct understanding that an immediate report is submitted to Government.

From officiating conservator of forests, lower provinces, No. 267 dated 21st September 1869, paragraph 7.
To officiating conservator of forests, lower provinces, No. 3644 dated 12th October 1869, paragraph 2.

30. The operations of the forest department during the year under review have, as shewn on the margin, resulted in a deficit, while the results of the previous year's work were marked by a very large surplus. Deducting, however, from Rs. 55,673-13-8 the difference (Rs. 18,942-6-5) between assets and liabilities at the commencement and close of the year under notice, the deficit is reduced to Rs. 36,731-7-3, which if deducted from the total collections of forest revenue made by the district officers, amounting to Rs. 73,552-0-8, leaves a surplus of Rs. 36,820-9-5 at credit of the forest department as nett revenue from the forests of Bengal. Compared with that of the previous year, this result cannot be regarded as altogether satisfactory, but it is noticed that the value of timber in hand on the 31st March 1870 amounted to Rs. 2,91,441, or Rs. 20,844 in excess of the previous year's return.

Financial results.—Section 5, paragraphs 47 and 48.

Statement of annual account of forest revenue for 1869-70.

1	2	3	4	5
Years.	Receipts.	Expenditure.	Surplus.	Deficit.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
1868-69 ...	1,71,184 7 1	1,26,256 7 0	44,928 0 1	.....
1869-70 ...	40,200 8 9	95,874 6 5	.....	55,673 13 8

31. There has, it appears, been an increase from Rs. 53,362-4-1 in 1868-69 to Rs. 73,552-4-1 in 1869-70 in the collections of forest revenue made by the civil officers. This is satisfactory, but no details of these collections have been furnished in the present report, as was done in the report of last year. The Lieutenant-Governor desires that such details may not be omitted in future reports.

General.—Section 6, paragraphs 55 and 56.

Government of India, public works department, No. 547F dated 5th November 1869.
Government of India, public works department, No. 183F dated 28th March 1870.
Government of India, public works department, No. 312F dated 17th June 1870.
Government of India, public works department, No. 414RF dated 4th August 1870.

32. The correspondence cited in the margin shows that sanction was accorded—in anticipation of confirmation by the Home Government—to revised establishments for the forest department in Bengal from the 1st of January 1870. The following is the scales of charge before these revisions and that finally determined upon:—

OLD SCALE.

Two forest divisions.

	Rs.
2 assistant conservators, at Rs. 400 each	800
2 office establishments ...	196
2 divisions' forest and depôt establishments	238
Total Rs. ...	1,234

REVISED SCALE.

Six forest divisions.

	Rs.
6 assistant conservators on an average pay of Rs. 350 according to the new organization ...	2,100
6 office establishments ...	470
6 divisions' forest and depôt establishments	830
1 native doctor for the Assam division	20
Total Rs. ..	3,420

33. This increase to the existing staff of forest officers and subordinate establishments—which does not, however, include the charge for a conservator and his office establishment—was considered to be absolutely necessary, as without additional agency in such parts of the country as contained forests and waste lands at the disposal of Government, no satisfactory progress in forest conservancy could be expected. The Lieutenant-Governor trusts, now that the vast forest tracts in the lower provinces have been placed under an increased establishment of management, that a proper system of inspection and conservation will be maintained.

The correspondence* on the subject of the complaints against the appointment of untrained officers to the forest department and the urgent necessity of obtaining the services of young men who have previously received some training in forestry, has been forwarded for the consideration of the Government of India.

* Forest proceedings, July 1870, Nos. 16 to 18.
" " Oct. " " 4 " 8.

34. The acknowledgments of the Lieutenant-Governor are due to the conservator and officiating conservator for the interest displayed by them in promoting the efficiency of the forest department.

By order of the Lieutenant-Governor of Bengal,

RIVERS THOMPSON,

Offg. Secretary to the Govt. of Bengal.

No. 4846.

COPY of the above resolution forwarded to the conservator of forests, lower provinces, for information, in reply to the report submitted by him with letter No. 155 dated the 27th July 1870.

No. 4847.

EXTRACTS (paragraph 11) of the above resolution, and of the remarks of the conservator and assistant conservator respectively, forwarded to the commissioner of the Assam division for information.

No. 4848.

EXTRACTS (paragraph 14) of the above resolution, and of the remarks of the conservator and assistant conservator respectively, forwarded to the commissioner of the Assam division for information.

No. 4849.

EXTRACTS (paragraph 25) of the above resolution, and paragraphs 31 and 32 of the conservator's report therein referred to, forwarded to the Secretary to the Government of Bengal in the Public Works Department for consideration.

By order of the Lieutenant-Governor of Bengal,

H. S. BEADON,

Offg. Under-Secy. to the Govt. of Bengal.

FORT WILLIAM,
The 12th December 1870.

PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN THE

LOWER PROVINCES OF BENGAL,

FOR THE

Year ending 1st April, 1871.

BY

H. LEEDS, Esq.
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Calcutta:
PRINTED AT THE BENGAL SECRETARIAT OFFICE.
1871.

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PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN THE

LOWER PROVINCES OF BENGAL,

FOR THE

Year ending 1st April, 1871.

By H. LEEDS, Esq.,

CONSERVATOR OF FORESTS, BENGAL.

No. 234, dated 31st July 1871.

From—H. Leeds, Esq., *Conservator of Forests, Bengal,*

To—The Secretary to the Government of Bengal, Revenue Department, Fort William.

I have the honor to forward the Annual Forest Administration Report for the year ending 1st April 1871.

SECTION I.

Inspection of Forests.

Upper Assam.

The general inspection of the forests in Assam was completed in April and May 1871. The work done during those months was included in last year's Report as part of the season's work.

2. It was intended that during the past season valuation surveys, with a view to selections of tracts as Reserved Forests, should be made on the Dehing and Dhunsiri rivers, Upper Assam; and work was commenced in the Jeypore mouzah, where several surveys were made and entered on the district map; but the health of the Assistant Conservator having broken down early in the season, the work was stopped, there being no other forest officer at hand to carry it on.

Lower Assam.

3. In Lower Assam instructions were issued for survey of the Kamroop Dooars, which are rich in Sâl, as also of the Sâl tracts in the Durrung district; but from several causes, arising partly from sickness of the officer in charge of the sub-division, the loss of time incurred by him in joining, and want of general aptitude for the work, nothing was done.

4. As belonging to Lower Assam sub-division, this is perhaps the best place to refer to the Jeerung forests in the Khasi Hills, reference to which was made in paragraph 13 of Government of Bengal resolution dated 12th December 1870. It appears from a report submitted to the Commissioner of Assam by the Deputy Commissioner, Khasi Hills, that British interests in these forests commenced from the year 1859, when an agreement was entered into between the Government and the Chief in charge of the Jeerung ilaqua, under which Government obtained a perpetual lease of these forests.

5. The translation of the document runs as follows:—

"I, Chootoo Sadoo Sing, Rajah, Zemindar of Jeerung ilaqua, execute this agreement, that at the wish of the Government I willingly lease all the forest and waste lands pertaining to the Jeerung ilaqua (by the clearing of which no damage will arise to the ryots of the ilaqua), and also all minerals that may be discovered hereafter, to the British Government in perpetuity. I agree that from henceforth the said Government may, at their pleasure, receive revenue from those lands, causing them to be brought under cultivation, or settling them under ryots, and that neither I nor any of my heirs or representatives will have power to raise any objection to the present agreement. All disputes about such lands will henceforth be adjudicated by the Government without my interference. This is on the understanding that my heirs shall receive from Government half the rents derived from such lands; and that should no rent accrue, no claims on my part for rent shall be accepted.

"Without the permission of the British Government, neither I nor my heirs will have the power of transferring any lands in the said ilaqua either to Englishmen or Bengalees.

"In case of my doing so, the lands will be liable to seizure by the Government.

"*Dated* 15*th September* 1859.

"*P. S.*—The agreement and the timber forest for that ilaqua, which was given by me, will also remain in force.

"CHOOTOO SING, *Rajah.*"

6. It would appear from the postscript that some agreement had been previously made, which is again confirmed; but this former agreement cannot be traced.

7. There is no record of anything having been done with the forest until 1863, when it was leased to a Mr. Bainbridge for five years at a yearly rent of Rs. 100.

One Bhakut Sing of Moyrapore was allowed to work it for his own advantage during this time; but what he paid to Mr. Bainbridge for this privilege is not recorded. Little appears to have been done with the forest at this time. At the expiry of this agreement the forest was sold, in 1868, for three years ending April 1871, to one Chand Rae of Nung Khlow. The sum paid for this lease was Rs. 150 per annum. The forest was sublet during this period to Totee Ram, a native of the plains, for Rs. 400 a year. This man appears to have become aware of the value of the forest, and set himself to work it as far as his means admitted. At the end of the lease, April 1871, having, as he states, some 1,200 logs felled in the forest, and 300 boats made of Sâl ready to remove, he was anxious to renew the lease, and applied jointly with the Jeerung sirdar, who also began to see the value of the timber, to the Deputy Commissioner for a further lease, offering this time Rs. 2,400 for a three years' lease. The matter was referred to the Commissioner, who has declined to approve of any lease being given until the Forest Department has reported on the subject. The matter is now under consideration. The forest appears to be of some value, and covers a considerable area, having good water-carriage for timber.

8. It will be inspected and valued early next season by a forest officer. Meantime, probably, some temporary arrangement for one year will be made by the civil authorities, under which the timber felled and boats prepared will be taken over by Government, the man Totee Ram receiving some consideration for the work done by him in felling and preparing the timber now lying in the forests, though he has no right whatever to claim anything, as he may be found useful as a contractor to remove the timber to depôts hereafter. It would appear that the agreement entered into with the Rajah was not with a

view to profit which might be derived by Government, but to assist the Sirdar, and let him derive some of the advantages that would accrue from a proper management of the forest by Government. Under these circumstances, any arrangement made should be of a liberal nature, suited to the spirit of the agreement entered into, yet such as will protect the forest from destruction.

9. The neighbourhood of this forest to our Kamroop Dooar forests has given us some trouble in protecting the latter, as it is difficult to prove, in case of plunder of our forests, whence the timber brought down comes. The Jeerung forest should be made over to the Forest Department, and probably the best way of dealing with the "Rajah" (?) would be to agree to pay him a fixed yearly sum instead of half profits, so that his finances might not be subjected to periods of interruption when no profits accrued.

Bhaugulpore Forest Division.

10. Inspection of forest in this division was carried on in Hazareebaugh, Lohardugga, and Singbhoom; also in one of the tributary mehals, Gungpur.

Chota Nagpore.—Hazareebaugh Sub-Division.

11. In Hazareebaugh sub-division no Government forests were met with. The Ramghur and Dhunwar estates occupy almost the whole of the district. There is little timber of any value on these estates. The executive engineer still obtains some at the station of Hazareebaugh at comparatively low prices, viz. eight annas per cubic foot for large scantlings; but stocks are reported to be small. If something in the shape of forest management were introduced, valuable forests might probably be formed at little cost, for young Sâl is seen growing over large tracts; but none of it is enclosed, and thus it is all kept down by unceasing collection of charcoal (made in a most primitive and wasteful manner) and firewood over the whole area. If certain tracts were set apart periodically for these supplies, while others were hedged in or enclosed for a certain number of years, all trespass within them being prohibited, tracts of forests would be formed for future supplies of timber without any present decrease of revenue derived from charcoal and firewood pottahs. Few trees are seen over the whole of this district except the wretched Salee (*Boswillia Glabra*), left on the hills owing to its perfect worthlessness. It is not even used as firewood. A gum, it is said, can be extracted from it; but nothing appears to be known of its properties in the district. Wood is scarce, and is rising in price. Within the last five years the value of Sâl saplings has doubled.

12. At Lillagun a quantity of young Sâl from the Ramghur estate (Echack) was met with. It was going down to Gya for sale. These saplings, purchased from the estate agents at Rs. 2-8 per 100, fetch in Gya Re. 1 to Rs. 1-8 each. There is room here therefore for improvement of revenue paid to the estate, as the cost of transit to Gya is small.

13. In a letter from the Commissioner of Chota Nagpore (No. 1297 of 12th May 1870), it was reported that seventy-seven patches of Sâl, covering an area of 2,362 acres, were reserved on the Dhunwar estate; but after inquiry they proved to be private property, and the estate under management by the Court of Wards, so that no interference with them on the part of Government can take place, except in the shape of advice to the Agent if asked for. These patches should certainly be protected and extended gradually, which could easily be done.

Lohardugga.—Palamow Sub-Division.

14. The first inspection tour of this sub-division began at the junction of the Koel and Soane rivers up to Daltongunge, and thence on through the district in a southerly and easterly direction, ending at Hazareebaugh.

15. This sub-division bears evidence in almost all parts of its having once contained very extensive Sâl forests; but all timber of any size may be reported

as having entirely disappeared. The Public Works Department, being much in want of timber for the irrigation works now being carried on both east and west of the Soane, obtained the permission of the Government of Bengal in June 1869 to work the forests in this district, as there was not then any forest establishment appointed to it. They explored the country along the Koel and also the Kymore range, and came upon a forest near Kamunday and Gunkter, on the banks of the Koel, where 800 dead Sâl trees, standing in paddy-fields, had been reported, as also some timber of large size standing in the forest around. The timber is, however, very inferior in quality, and very deficient in quantity, so far as the Government lands are concerned. The distance it has to be taken to the Soane, about 100 miles by cart, will also make it very expensive.

16. A good deal of Koossum (*Schleicheva Trijuga*) and other wood is available on private estates on the banks of the Koel, lower down which the Public Works Department are felling and sawing up, chiefly on river-banks.

17. They obtain this timber from the owner by paying a fixed charge per axe used in the forest during one felling season.

18. As there is no stipulation made that only such timber as can be taken away during the season is to be felled, the proprietor of the forests has rather a bad bargain, as the axe is set to work very freely, and the timber cut is subsequently taken away at leisure.

19. In order to save some of the growing Sâl in the district from destruction by the inhabitants, who joom the land, the Assistant Commissioner at Daltongunge, during a late settlement of the Government lands in the district, set apart certain blocks in each farm, to the extent of some 149 square miles, as Reserves, in which no cultivation is to be carried on. These blocks are covered with young Sâl, and, if left to grow, will certainly hereafter produce valuable timber. But the Koel being useless for rafting purposes, owing to the quantity of rocks in its bed at various places, and the rushes of heavy water which during the rains come down it, so as to render navigation of all kinds very dangerous, timber in these localities is comparatively of little value except for local purposes.

20. These demands, however, deserve attention, as they will probably be considerable hereafter, when the mineral wealth of this district, which is believed to be very great, shall have been opened out, and stocks of timber in the neighbourhood will be very valuable.

21. For these, as also climatic reasons, areas of forest covered land should be suffered to grow.

The Assistant Commissioner was addressed on the subject of restricting the inhabitants to cultivating within certain defined areas, giving them land enough to allow of a cycle of five years' rotation of cultivation.

On this subject he reported that in his opinion it would not be advisable further to interfere with the people at present. They had grumbled at the Reserves already made, and if interfered with further, might possibly leave the district altogether and go into the neighbouring tributary mehals of Sirgoojah and Jushpur, where they could get as much land as they liked without any restrictions at all.

22. These objections are sufficiently strong to render it unadvisable to do more at present than protect the blocks now reserved; but should not joomeahs, wherever found, be gradually brought to cultivate within certain boundaries, which might periodically be curtailed until they leave off their nomadic mode of life—one which induces idleness and proverty—and become settled, industrious, and useful members of the community? Jooming to the tribes settled on the hills and mountains, where the plough cannot be used, is *a necessity* to their very existence, for they cannot be expected to use the hoe

where there is abundance of land for them to roam over without any injury to any one (the richest forests being valueless unless so situated that the timber can be profitably extracted); but the matter is different in the plains, where jooming is not necessary, and induces idleness and poverty.

23. Measures have been taken to get the reserved blocks above referred to mapped, and the orders of Government will be obtained regarding their management, *i.e.* whether the Assistant Commissioner shall be responsible for their protection, or whether the Forest Department should take charge of them. Probably for some years to come the Assistant Commissioner will be best able to protect them, as a forest establishment to look after them would cost very much more than if this were done by the Assistant Commissioner, assisted by periodical visits of inspection by a forest officer during the dry season.

24. At Shapore (Daltongunge) it was reported that during the hot weather the wells were dry, and the only water to be got was from the Koel. The new Forest Bill will perhaps be useful on this point, if scarcity of water arises from both clearing of forest and felling of all timber on the banks of the streams.

25. The Government of India drew the attention of the Irrigation Department in September 1870 to the felling of Koossum, before mentioned, which grows along the banks of streams, and should be preserved so as not to lay them bare.

26. At present, on private estates the felling of trees on river-banks cannot be interfered with, although this practice not only affects the supplies of water, but also injures the water-ways, owing to the branches and trunks of trees falling into the rivers and forming snags as also sand banks. No timber should be felled on the main banks of the streams, at least within 100 feet of the water's edge. Orders exist, issued by this department, to this effect; and only in exceptional cases, such as there being some fine tree near a river, the removal of which would in no way expose the bank, is felling allowed. These orders have not been strictly carried out at present, as supervision has been impossible; but they are gradually becoming known, and will be acted up to as conservancy is better understood.

27. A good deal of Khair (*Acacia Catechu*) was met with on the inspection tour; but the trees have been so frequently cut over and so much injured, that none of them at present produce any cutch. It was reported in the district that a certain class of natives used formerly to come into the neighbourhood every cold season to chop up and boil down the wood, but that this manufacture had latterly entirely ceased.

28. A second tour of inspection, by the Assistant Conservator only, was taken from Hazareebaugh to Ranchi, and onwards to Chyebassa, where the Lohardugga district joins Singbhoom; also from Borunpahar towards Sumbulpore for twenty miles, but no Government forests were met with. What forest there was, belonged to zemindars.

29. This district was traversed from Bandgaon, forty miles from Ranchi, to Chyebassa, through the sub-division of Sarunda to Saitha village.

30. Between Bandgaon and Kenaghat some fine forest of Sâl was seen, but it all forms portion of the estate of one Urjoon Sing of Porahaut, now a State prisoner at Benares. This estate has during his life-time been sequestered, and is to be returned to his family after his death. At least this is what the people in the neighbourhood stated.

31. Near the village of Saitha, Sâl forest was met with, which is the property of the Government. It is situated in the Kolhan country (the country of the Kools). The tract of country is hilly, and water-carriage for timber distant and bad.

The forest itself is poor, and needs for the present, its existence having been recorded, no further notice here.

32. Near Goilkera, and on to the banks of the South Koel, some very fine forest of Sâl was met with. This is also the property of Urjoon Sing.

SARUNDA.

33. In Sarunda Government is the zemindar, and here at last Sâl forest which could be at once taken up for conservancy and working was found. The area of forest in Sarunda is about 500 square miles.

34. Here, strange to say, jooming does not appear to be the mode of cultivation.

Destruction of another kind, not however so bad in its effects as jooming, though still very destructive, has gone on. The Sâl trees have been tapped to produce a species of resin, the value of which is only Rs. 2 to 3 per maund; and as a tree produces only about one seer of resin, some forty to fifty trees are destroyed for Rs. 3 worth of resin.

This resin collection was stopped by order of the Government of Bengal in March 1869, on representations of the Deputy Commissioner.

35. Almost the whole area of Sarunda is forest, and is available for forest conservancy purposes. Means of exporting timber, easy; navigable streams, good;—the South Koel,* Karo, and Brahminee.

"From Udsu I (Captain Losack, the Assistant Conservator) came by river to Garjan, on the Brahminee, easily in the month of March, and am confident that there would be no impediment to rafting timber immediately after the rains as far as Bonai, about twenty-five miles below Garjan." From here it could be easily taken on down the Brahminee, as large boats navigate this river up to that point at all seasons.

* *Note,*—This is not the Koel referred to in the Palamoa district, which for distinction may be called the North Koel, as it runs to the north, while this Koel runs to the south and south-east.

36. But the value of the timber, it is feared, is very much reduced, owing to the distance of large markets. Unfortunately the Brahminee flows into the Bay of Bengal at False Point, whence to ship it would be expensive. Possibly some other way may be found of taking the timber during the rains through creeks towards the Damooda.

37. The Assistant Commissioner will be deputed to explore the country and make full inquiries on the subject this season. The South Koel is also good for rafting. Timber has been rafted to Cuttack from Sarunda.

38. It appears from a letter from the Deputy Commissioner that the inhabitants have no rights to any farming produce except for their own farming purposes.

39. No regular valuation survey was made in these forests this season, but the Assistant Conservator reports that two trees of first class timber per acre may be estimated standing in the forest. Even if this estimate be reduced to one-fourth, or two trees to four acres, this would still show a very large stock of first class timber available for removal.

40. The stock of girdled trees ready is estimated at thousands, so great has been the killing of trees through resin-collecting. A close inspection and valuation of this forest will form one of the first operations for next dry season; and meantime all information regarding cost of removal and markets, together with price to be obtained, will be collected.

41. The Deputy Commissioner will be applied to so that some protection of the forest may be exercised pending arrangements for putting it in charge of the Forest Department, after the maps now being prepared have been completed, and transfer of the forest has been approved by the Commissioner of the division. In the meantime a small establishment, under orders of the Deputy Commissioner, but paid out of the forest establishment sanctioned for this division, will be stationed in it if deemed necessary, as it is not advisable to place isolated native establishments in charge of forests at a distance from reach of an

European officer, for they are apt to spread reports which unsettle and alarm the inhabitants (who are generally timid and ignorant people) instead of instilling confidence among them.

Tributary Mehals.—Gungpur.

42. A trip was taken into this territory, which is on the borders of Sarunda. It contains much fine Sâl forest, with a good stream for transport purposes; the Sunk and Kool clearances for cultivation are destroying parts of the forest.

If found advisable hereafter, something perhaps may be done in the way of leasing portions of these forests. The proprietor does not appear to work them, and is probably not possessed of the capital to do so.

Patna Division.—Gya Sub-Division.

43. This sub-division was crossed by the grand trunk road from Burhee to Dehree. A short halt was made iti Sherghotty to inspect land between the Moorhur and Silajun rivers, close al [illegible] rgotty, which had been reported as suitable for plantations. On r.ntr[illegible] to the Assistant Commissioner at Sherghotty it turned out that the [illegible] been granted to cultivators on various leases and settlements.

44. It appeared to be suitable for Teak plantation; and if areas of sufficient extent can be obtained at reasonable rates, portions of it might with advantage be taken up for this purpose. The subject will be referred to again in Section 3, Plantations.

There are no forests whatever in this tract worth notice.

Shahabad Sub-Division.

45. So much had been verbally reported regarding forests in this district, and especially on and near the Kymore Range, that a special point was made of visiting it. But great was the disappointment experienced, in crossing the Soane at Dehree, to find on the march up to Akberpore that the sides of the hills were only covered with small bamboo, and that no tree forests existed anywhere about.

Everything in the shape of forest has disappeared, and the irrigation works are using up as tramway sleepers, and for other purposes, the remaining saplings of various kinds of trees, the only remaining representatives of the formerly existing forest.

46. This district formerly produced very fine Ebony, of which specimens were shown by Mr. Davis, a resident of Akberpore. Here specimens of some other beautiful woods were shown by Mr. Davis that had many years ago been obtained from the Kymore Range; but forests in which they grew are gone, and the few saplings of these trees which remained a short time ago are now lying on the ground as sleepers, on which stone is carried for the works from the hills.

47. When the plateau on the top of the range was visited, the same disappointment was experienced. Except some small patches of Sâl forest in an almost inaccessible place for working, there appeared to be no forest on the plateau. This tract had been gone over by the engineers of the irrigation works in search of timber, and had there been any of value, they would not have gone 120 miles off near Sirgoojah for timber.

48. On the road up to Akberpore, and towards Daltongunge, quantities of Koossum posts were met with being taken down by bullocks for the irrigation works. The posts (value Rs. 2 at the works) were all young saplings, about 10 feet long. The denudation of river-banks under these supplies may be judged of, but of course the works must be provided with wood.

49. The following is a list of some of the trees met with in the Chota Nagpore district, drawn up by Captain Losack, the Assistant Conservator:—

No.	English.	Systematic.	Local.
1	Babool	Acacia Arabica	Babal.
2	Khair	Acacia Catechu	Khair or Kheira.
3	Siriss	Acacia Speciosa Sirissa	Siriss.
4	Bail	Œglo Marmelos	"Bel" or "Loagsee."
5	Jack-fruit tree ...	Artocarpus Indica	"Kuttal" or "Porsoo."
6	Neem	Azadirachta Indica	Nim.
7	Mowah	Bassia Latifolia	Mowah.
8	Cotton tree	Bombax Malabaricum	"Semul" or "Edel."
9	Dhak	Butea Frondosa	Porassie.
10	Amultas	Cathatocarpus Fistula	"Sanal" or "Haree."
11	Toon	Cedrela Toona	Toon.
12	Dhan	Conocarpus Latifolia	"Dho" or Hesel.
13	Sissoo	Dalbergia Sisso	"Pea Sal" or "Heet."
14	Ebony	Diosphyros Speciosa	Keond.
15	Aonla	Emblica Officinalis...	"Aola" or "Merel."
16	Pepul	Ficus Religiosa	"Pepul" or "Hessa."
17	Pakkar	Ficus Venosa	"Parkur" or "Laru Hessa."
18	Gamhar	Gmelina Arborea	Kasuar.
19	Mango	Magnifera Indica	"Am" or "Lili."
20	Horse radish tree ...	Moringa Pterygosperma	"Sagna" or "Mulga."
21	Koossum	Schleicheva Trijuga	"Koossum" or "Baroo."
22	Sâl	Shorea Robusta	"Sarjee," "Sal," or "Sakooa."
23	Jamun	Syzygium Jombolanum	"Jamun" or "Koda."
24	Tamarind	Tamarindus Indica	"Teetool" or "Tojo."
25	Urjoon	Terminalia Arjuna	Gara Hatua.
26	Hur	Terminalia Chebula	"Hurtokee" or "Kola."
27	Asan	Terminalia Tomentosa	"Usun" or "Hutna."
28	Bair	*Zizyphus Jujuba*	"Kul" or "Bakra."
29	Kamela	Kottlera Tinctoria	Sindwah
30	Salleo	Boswillia Glabra	Sallee.

Bhaugulpore Division.

50. In this division the Government estate of Damin-i-koh in the Sonthal Pergunnahs was surveyed by Mr. Reid, the Supernumerary Conservator temporarily attached to Bengal. The district is divided into three damins, viz. the Doomka, Godda, and Rajmehal damins.

51. The area is about 1,300 square miles. A range of hills not exceeding 1,800 feet in height runs down the whole length of it, throwing out lateral spurs east and west.

52. The Doomka damin comprises the southern portion of the district between the Brahminee and Bunslol rivers. The Godda damin extends along the western face from the Bunslol to the northern boundary. The Rajmehal damin extends from the Bunslol to Sahibgunge, along the eastern portion of the district.

53. The estimated area covered with forest is stated to be 119 square miles, of which 70 square miles is Sâl. The other timber trees met with in the district are reported as Passur, Latsar, Sissoo, Asun, Dhan, which are all more or less valuable for domestic purposes.

54. The situation of these tracts between the Chord and Loop lines of the East Indian Railway, added to their being irrigated by streams down which timber can be taken to the Ganges, renders them of very great value. There are, however, several great difficulties connected with a plan of management of these forest tracts arising out of political and other reasons, such as the distribution of villages throughout the Sâl tracts and the rights of the Paharia and Sonthal tribes who inhabit the country.

55. There is not much mature timber for present felling, but there are large tracts covered with young Sâl, which, if saved from periodical destruction, will be of immense value hereafter.

Mr. Read's report, as also that of the Commissioner of the division upon it, are now under consideration of the Government of Bengal. Such tracts as can be set apart without disturbing the minds of the inhabitants will probably be reserved, and the inhabitants will in time be educated to see that so far from conservancy of forests injuring them, it will turn out to be a source of employment for their labor, and benefit them in many ways.

56. There has certainly been very extensive clearing all over the district; the banks of streams are said to be laid bare: and the country must gradually suffer unless measures are taken to save the Doomka and Godda damins from the fate of the Rajmehal damin, which is thus described:—

"The entire aspect of the country to the north of the Gumani river is wholly changed, owing to the hills being so completely denuded of all indication of forests. The slopes are for the most part covered with a stunted species of scrub jungle, through which the sun easily penetrates, and fully accounts for the numerous dry beds of water courses that are so often met with in the valleys."

57. Such complete clearing of a country, there is no doubt, affects its water springs, and must bring it to desolation. The Rajmehal Damin contains only six patches of Sâl forest, area about 4¼ square miles. Every traveller, who has passed up the East Indian Railway between Teenpahar and Sahibgunge will endorse the description of the Rajmehal damin here given.

58. The following statement, which accompanies Mr. Read's report, gives much local information concerning the distribution of the district under cultivation, forest, and waste.

Name of Locality.	Sonthal cultivation.	Paharia cultivation.	Rocky ridges and river beds.	Forest not Sâl.	Sâl forests.	Total.
	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.	Sq. Miles.
Doomka damin	7·30	21·33	7·30	14·60	21·90	73·00
Godda „	8 80	22·00	2 00	33·00	44·00	109·80
Rajmehal „	.....	.....	.....	.....	.....	.....
Tract No. 1	.....	10·00	.....	.....	1·25	12·00
„ „ 2	·16	·20	·60	1·35	·60	3·00
„ Nos. 3 and 4	.....	.....	·50	.....	1·50	2·00
„ No. 4	.. ..	·25	1·25	·50	·100	3·00
Total .	16 26	55·19	11·65	49·45	70·25	202·80

59. Mr. Read's report is very full of information; but as the Conservator has not been able to visit the district himself during the year, and he can form no opinion regarding it, it is not deemed advisable to attach it to the annual report. It can be published hereafter, with correspondence and orders relating to the forest conservancy to be introduced into this district.

Cooch Behar Division.

60. In the Cooch Behar division examination of forests was confined to inspection of the tract called the Dulka Jhar in the Terai, and some patches of Sâl forest, the property of a zemindar who had offered them for sale to Government.

61. The Dulka Jhar, which up to this year appears never to have been explored, was reported to be a perfect den for wild beasts, and the seat of malaria, which was disseminated through all the surrounding districts. The Deputy Commissioner reported that cultivators dreaded its neighbourhood so much, that large tracts of land, which would otherwise be cultivated, remained waste, and that the wild elephants it harboured destroyed the crops. Under these circumstances, and the fact that application has been made to purchase it from Government, it was deemed advisable to have it explored.

62. For this purpose the Assistant Commissioner was desired to clear two lines at right angles 15 feet wide through the tract, and report as to its value. This work was done, but the present value of the tract as a Sâl forest appears from the report to be anything but satisfactory. It contains no timber of value for present felling, and a large portion of the tract, which covers an area of 5,059 acres, is low and swampy, containing heavy masses of valuable cane brake. It will, however, probably become of considerable value hereafter if closed for forty or fifty years, as most of the Terai Sâl forests must lie, owing to their having been almost completely cleared of all mature timber by contractors, who made large fortunes previous to the introduction of forest conservancy.

63. It is proposed to clear lines through the reserved Sâl forests in the Terai and Bhútan Dooars gradually every year. It is known that the Terai tracts have been cleared out of large timber; but there is still some in them suitable for local purposes, which will pay the cost of these clearances, and they should be made not only for the purposes of exploration, but for gradual improvement of the tracts and communication through them.

64. In the forests of the Bhútan Dooars there are still considerable stocks of valuable timber, and opening out lines of communication in them is necessary to their systematic and proper working.

Chittagong.

65. The Government forests in this division were notified in the *Calcutta Gazette* of 1st February 1871. They extend over an area of 5,670·5 square miles.

66. They are situated almost entirely within the Hill Tracts, and their boundaries at the foot of the hills are nearly identical with these tracts. Natural boundaries, such as water-sheds of ranges and rivers, have been taken to define the other boundaries.

67. Two tracts, as defined below, are proposed as reserved tracts, viz.—

1*st*.—The Kassalong Reserve; area, 875 square miles.

North.—Hill Tipperah and Cachar.

South.—The Kurnafoolee river from Kassalong to Burkhal Falls.

East.—The Burkhal and Sirthoy Thlang ranges.

West.—The Myanee and Kassalong rivers.

2nd.—The Soobalong Reserve; area, 91 square miles.

North.—The Burkhal Tong.

South.—The head-waters of the Soobalong river.

East.—The Sychal range.

West.—The Soobalong river.

68. No demarcation of these tracts will be necessary, the natural boundaries being complete.

69. Inspection of the forests during the past season was carried on in the forests by the Assistant Conservator, Mr. H. H. Davis, who reports, "between the junction of the Soobalong and Kurnafoolie, as far as Bellaissure, a distance of about twenty-two miles, and the tract between Kassalong and Kharkhorea, about thirty-six miles, as well as the forests bordering on the Kassalong between these places and those along the Kurnafoolie as far as the Burkhal Falls. The cuttings that have been carried on during past years have told very much on these forests, and timber is very scarce in places where it has been easy to get out, the borders of streams being entirely denuded; whilst further inland, where the woodman has not been able to get out a log, the boat-digger or surveyor has taken his place, and everywhere the most valuable trees have been taken out, whilst the more abundant and fast growing kinds, such as Gurjun, are still plentiful. Toon has been nearly eradicted, and other kinds of valuable woods have only just been saved in time. Had unlimited cutting continued for five years longer, I venture to say mature Jarool, Chaplis, and woods of a similar class, would not have been found in the forests bordering on the Kurnafoolie or Kassalong rivers."

Extract from Mr. Davis's report.

70. He goes on to state that he would have made a point of inspecting very much larger tracts of forest both on the Kurnafoolee and other rivers, but without police escorts and elephants it would have been quite useless to attempt getting into the interior, as he would have stood a fair chance of having his party of men cut up by Kookies in the first place, and secondly he would not have been able to procure supplies after he had once started.

71. Application for police escort was made some time previous to the season for inspecting the forests, but the district police were all required for special duty, and no escort could be granted.

72. It was impossible to find elephants in the district; but the purchase of elephants has been sanctioned by Government, and elephants will be provided next season.

73. "Within the Government forest boundary lines there are no private forests. On zemindaree lands in the regulation district there are small detached forests containing timber trees and bamboos; and on the tea estates owned by Mr. Windram, at Ramoo, and Mr. Macalpin at Femoa, there are some fine forest trees; but the whole product of these private forests combined would not supply the requirements of Chittagong and adjoining districts for more than two or three years at the outside."

74. The following rivers are used for floating down timber and other forest produce, and should be kept open for such, viz.—Fenny, Kurnafoolie, Surta, Droong, Huldah, Essamutty, Seelak, Chingree, Soobalong, Kassalong, Sungoo, Daloo, Mamoree, Eadgong, Bagkhalee, Razoo, and Nauf.

75. All the forests in the division are of a mixed nature, the kinds of trees found in those situated to the south differing from those in the north, near Kasalsong.

Dacca.

76. The Dacca division still remains unexplored, as the officer appointed to it this year resigned his appointment early in January, and it has been impossible for the Conservator to visit the division during the year.

77. The unsettled state of the tribes all around will probably defer any conservancy measures in this district except for local purposes, and for these they are more than abundant; its forests have probably little present value, owing to their isolated situation, cut off from all possibility of bringing the timber from them to a profitable market.

SECTION II.

Reserves.

78. There are no additional Reserves to note as having been made during the past year.

Bhutan.

79. A list of forest tracts proposed as Reserves in the Bhútan Dooars, together with their boundaries, as approved by the Commissioner of the division, containing 3,398 square miles, was given in the report for 1869-70. They have not yet been notified in *Gazette*, or been transferred to the Forest Department, which is, however, in charge of them, as the time for appeals in case of private rights in the forests under Act. XVI of 1869, called the Bhútan Dooars' Act, has not yet elapsed.

80. Very little permanent demarcation of boundaries will be necessary, as they are for the most part either natural or the fixed local boundaries of mouzahs.

Assam.

81. In Assam the selection of Reserves has not yet taken place. The forests have all been inspected, but the revenue survey maps of the country not being yet complete, it has not been possible to define the forest tracts sufficiently to enable the Commissioner to approve any proposals made to him on the subject.

82. In June 1863 the Nambur forests in the Seebsaugor ct were notified as Government Reserves, and were made over to this department in January 1869.

83. The Dooars in Kamroop were at the same time reserved from sale as waste lands, but the boundaries of these forests were not settled, as they had not been surveyed.

84. Besides these, a great number of tracts of country were notified as reserved from sale as waste lands on account of their containing rich forest, and many of these will eventually be included in Government forest tracts.

Chittagong.

85. In the Chittagong district it is proposed to reserve two tracts situated within well-defined natural boundaries, approved of by the Commissioner of the division, on the Kassalong and Soobalong rivers, which flow into the Kurnafoolie, some little distance below the Burkhal Falls. Estimated area, 900 to 1,000 miles. The timber in these tracts has been a good deal worked out, especially along the river-banks; but the tracts are well situated, and having contained very fine timber formerly, will, if closed now for a period, no doubt reproduce considerable

supplies for future years in addition to the reserved timbers which will be protected in the tracts which were notified as Government forests on 1st February 1871.

86. The unsettled state of the wild tribes, which surround British territory on all sides, renders it necessary to use great caution in enforcing any restrictions in the forests, and thus protection of them is difficult and action in them much restricted.

87. The only measure of protection that has yet been taken in the area of Government forests in Chittagong division already notified, has been to prohibit the "Capitans" of gangs of wood-cutters, who go up yearly into the forests for timber, from cutting trees below a given size, and thus to protect the young timber. This subject does not properly belong to this year's report, as the measure only took effect from the 1st of April 1871, when the river toll stations were made over to the officer of the Forest Department for collection of the revenue as sanctioned by Government; but it is perhaps as well to mention it here to show that measures were at once taken to introduce some means of protection to the forests, and this is one which does not affect the district inhabitants of the hills. It only affects the native class of wood-cutters in Chittagong, who have derived very large profits on the timber they have hitherto brought down, paying a mere nominal toll on the rivers to Government for it. The tolls now levied under Government sanction dated 27th January 1871 are somewhat more in proportion to the value of the timber brought down.

Sikkim.

88. It was not possible during the past year to do more than commence regular valuation surveys of the Reserves referred to in paragraph 17 of last report. One tract, the Dulka Jhar in the Sikkim terai, containing 5,059 acres, was inspected. A detail of inspection has been given in Section I.

Bhutan.

89. In Bhútan Dooars there is still some first class timber fit for removal, but the expense of removing it is very heavy. Examination of these Reserves should steadily go on every season, such trees as are fit for removal being at the same time marked by departmental officers. These will probably suffice for all local demands, and the tracts, as thus cleared, will be closed for a period of years, until such time as they have recovered themselves from the effect of the exhausting supplies which they were made to furnish during late years, previous to the introduction of a conservancy establishment in the Lower Provinces, Bengal.

90. Amongst the tracts of land in Sikkim made over to this department when first introduced in the district, there are some which have since been found to contain little or no timber, and also to be so situated as not to be of any value to the department for plantation purposes. These the Commissioner of the division wishes should be restored to the revenue authorities, and accordingly the authority of Government was sought in March 1870 to a transfer of such tracts. On this, two estates of Thurboo and Rungdoo, as containing no timber, and ill situated for plantations, as also a tract on the Tukoor Spur of no value to the department, were during the year given up and struck out of Reserves.

91. Some few more tracts will possibly be made over in like manner; but great care must be taken not to reduce the Government Forest Reserves without due consideration separately of the value of each tract on account of the timber on it, or its suitability for plantations. The tea interests of the district require that a certain area of plantations of Toon and other useful woods for boxes and charcoal should be made every year.

SECTION III.

PLANTATIONS.

SIKKIM.

92. IN Sikkim division there are the following plantations:—

One at Rungbool, area about 450 acres, containing Oak, Chesnut, Walnut, and Magnolia.

93. It was commenced in 1868 and was increased during 1869. Its general appearance in 1870 did not warrant its further extension, as much damage had been done either by cattle or wild animals, by which the tops of the young plants had suffered; and it became a question (should it be found necessary to enclose it by a fence) whether the expenditure on such enclosure would be advisable.

The reports lately received regarding it, however, are favorable, and the work may with advantage be continued gradually year by year.

94. The young plants on the Teak plantation in Bamunpokree, a spur of the Himalayas below Punkabaree, are now reported to be 20 feet high. The seed was put into the ground in August 1868. This was far too late; but the seed obtained from Burmah was delayed on the road. Had the seeds been planted in May, the plants would no doubt have been much higher. From one cause or other, partly perhaps on account of inferior seed and their having been covered too deep with earth, very many did not germinate until the following spring. The same thing occurred again in August 1870, when the plantation was extended, and the seeds are, many of them, only now coming up.

95. As there were plenty of seedlings to transplant at commencement of the rains of 1871, and seed from Burmah carefully chosen and packed in tin was received early this year (in April), it is hoped that the Assistant Conservator, who had early instructions on the subject, will be able to carry out the instructions given him to increase the plantation as rapidly as possible this season.

96. Toon is to be mixed with Teak in the plantation. This wood is light, and very valuable for many purposes. It is the best for tea boxes. The Assistant Conservator reports that the price of tea boxes in the district has increased from Re. 1 to Rs. 1-12 per box.

ASSAM.

97. In Assam the Teak plantation on the Dehing river, Seebsaugor district, contains plants standing 20 feet high, the seed of which was planted in 1869. This plantation is also being extended this season with seed from Rangoon, and also some obtained from Sherghotty (Patna division).

CHITTAGONG.

98. In Chittagong division land is being prepared for Teak planting, and seed from Burmah has been sent to the local forest officer.

99. The areas likely to be planted this season cannot at present be stated.

100. All these plantations can be extended over considerable areas hereafter, if it is deemed advisable to do so.

GYA.

101. It was hoped that a Teak plantation could have been commenced near Sherghotty this season on land which had been reported as favorable and available for the purpose. The tract was visited in January 1871, and

is certainly favorable for such plantations; but it was found hopeless to plant them this season, as the land is not available, except it be taken up under Act X of 1870.

102. It is worth remarking here that in the compound of the court-house at Sherghotty there are some third class Teak trees, the seeds of which germinate under the parent trees as thick as they can stand together, completely covering the ground, and that there are several specimens of fine young saplings around. Such a sight, although the Conservator has travelled over all the Teak tracts of British Burmah, he never saw before. It seems uncertain where the seed of the original trees was imported from. Some persons said from the Madras presidency, some from the upper waters of the Soane, where small Teak is met with. At any rate, the seed has found a genial and fruitful soil, leading to the inference that the neighbouring land is also very well suited to the growth of this kind of tree. The soil was inspected and found to be a rich sandy loam well suited to Teak. The country around is partly cultivated, but large areas could be obtained for plantations. It is sufficiently undulating for rain to run off the surface readily, which is a very important point, as standing water is very unfavorable to the germination of Teak seed and the growth of the young plants.

Sites for Plantations.

103. Here extensive plantations might be carried on should Government decide to commence such work on the submission of proposals on the subject.

104. On the Koel, near its junction with the Soane, there is also suitable land, and large areas might be advantageously taken up for plantations; and in Assam, on the high level lands at the back of the station of Bishnath, there are 7,000 to 8,000 acres of splendid land, the property of Government, suitable for the same purpose.

105. The great advantage of these sites does not only lie in their position, which is such as to render supplies of timber to all parts of the Lower Provinces easy and at low rates for transport, being situated near large navigable streams; but in their surfaces, being such that the road steamer, now coming into such general use, could here be employed for ploughing and preparing the land at one-eighth the cost of coolie labor, and at ten times the speed which could be obtained from manual labor.

Road Steamer might be used.

106. In a report on the subject of a trial on the estate of the Earl of Dunmore in March last, it is shown that after allowing 10 per cent. for outlay and wear and tear, and including all expenses connected with the engine, 5 acres of heavy and 7 acres of light ploughing can be done per day for 19*s.* 9*d.* or 3*s.* 2*d.* per acre. In Assam the cost of preparing land for tea cultivation is between £2-10 to £3 per acre. The expenses of a road steamer and plough would not be very much greater in this country than they are in England, as only three persons are required to work it, viz. an engine driver, a boy, and ploughman, and fuel would be always at hand. The cost of a road steamer, made with extra strength for this country, with roof to protect driver from sun, and with complete duplicate set of working parts, would be £950 in England, and a five furrow plough £70. Doubling all expenses in England (19*s.* 9*d.* per day for 5 acres), and estimating cost of work at £2 per day for only 4 acres ploughed (instead of 5 or 7 per day), we have a cost of 10*s.* per acre for ploughed land, after which, for tree plantations, little is required but to put in the seed.

Importance of Plantations.

107. If the work of plantations is to be of a satisfactory nature, it must be consolidated and sufficiently extensive to warrant the employment of a special and skilled staff for the purpose of carrying it out. Officers of divisions and

their assistants, where timber operations are carried on, have too much to do to enable them to give the time and attention to plantations which they require. The work is of the utmost importance if taken up at all, as all future supplies depend upon the success obtained.

Cost of Timber from Plantations.

108. It may be well to remark here that timber from plantations, as compared with timber brought from natural forests, will cost probably only one-fourth or less to bring to market. A log from a judiciously situated plantation may cost from Rs. 4 to 5, while from a distant natural forest it will probably cost between Rs. 20 to 30.

109. Thus, while it is necessary and advisable to protect a certain portion of *natural* forest in a country for local use, as also for climatic and other reasons, the stocks of timber in those forests are of value chiefly for local purposes, and while plantations are growing to maturity.

General Observations.

110. It will be found that "protection of the natural forests" in countries like those we have to deal with here (take Assam for instance), should only go so far as prohibiting the felling of under-sized trees of valuable kinds, leaving those of inferior kinds for general local use by the inhabitants of the country. To improve natural forests by planting or clearing, &c., even in tracts of Reserved Forests scattered about a district, if it is to be more than in name, will cost both money and time, which would be far better spent on compact plantations.

111. The small experimental plantations of Teak already made warrant the opinion that this kind of timber can be grown with advantage in Lower Bengal. As regards Sissoo, the trees planted in various parts of Assam lead to the same conclusion, and only scattering of the seed appears to be necessary to increase the area covered with this valuable timber. Toon also grows freely, and is very valuable.

112. It has not been possible hitherto, in consequence of the scant knowledge possessed of the country, and the limited area over which a forest establishment had extended, to frame any general scheme for plantations; but the subject is really one of the greatest importance with reference to future supplies. The increased price of timber, and the decreased size of what is sold, is an evidence of scarcity which cannot be doubted.

113. The Mango plantations of Tirhoot supply at present large quantities of timber, of which the opium factory at Patna uses some 5,000 tons a year, and there are still some stocks of timber on private estates; but these are all fast being used up and destroyed, and planting is not renewing them. Native proprietors are not yet aware of the value of their timber; nor is it likely that beyond a few exceptions Native forest proprietors will introduce conservative measures, except under compulsion, as they care only for present returns.

114. The Bycunpore forest on the Teesta, the property of the "Rycot" of that name, has this year been delivering its last stock of small timber, little above saplings in size. This forest extended over 90 square miles of country, and was favorably situated on the Teesta below the dangerous rapids, where the river issues from the Himalayas into the plains. This is one more example added to the number which have gone before. Attempts were made during the past three years to arrest the destruction of this forest, and to obtain charge of it by transfer or otherwise, but a continued lawsuit as to right of proprietorship has rendered all efforts unavailing. It is now destroyed as a timber-producing tract, and will probably be let out on pottahs for collection of fire-wood and

charcoal, unless some influence be brought to bear on the owners. If closed for a period of sixty years, it would again become a source of valuable supplies. Possibly, when the lawsuit referred to is decided, it may be possible to obtain possession of this property by exchange.

115. The question to be decided is, whether plantations on an extended scale shall be one of the chief works of the Forest Department to ensure future supplies, or whether it shall not. The small plantations hitherto commenced have been only experimental, to test the growth of Teak and the cost of planting. So far it would appear that Teak finds a favorable soil in the damp climate of Lower Bengal, and the cost of plantations may be estimated at between Rs. 25 and Rs. 30 per acre; but the rate would be very much less if consolidated blocks of plantations were made. With the aid of a steam plough to prepare the land, probably the cost would not be over Rs. 10 per acre.

116. Seeing that the Calcutta and neighbouring markets are so easily supplied by sea; that Assam, Dacca, Chittagong, and Bhútan, can supply themselves, it appears only necessary to provide for districts along the Ganges, which are at present dependent on Nepal and imports by sea, which are costly owing to distance of transport by rail. These districts might be hereafter supplied from plantations situated on the Koel, near the Soane, and in the Gya district, where large tracts of land could be obtained.

On Bamunpokree and Merig estate plantations would supply Sikkim.

117. This subject will form matter of special proposals for consideration of Government.

SECTION IV.

Yield of the Forests.

Assam.

118. In Upper Assam timber operations were opened out on the Debroo Nuddy, on the Dehing river, and also on the Dhunsiri.

119. The following report lately submitted to Government will show the nature and extent of the operations, which are of a tentative nature, to test the price at which timber might be extracted, the labor available, and the means of floating at hand. No estimate regarding the value of the forests as sources of supply other than for local purposes, or plan of working them, can be formed unless an experiment has been tried. The local demands are considerable, but they are not at present supplied from the forests of the country. The wood for tea boxes comes from Burmah, Chittagong, Kooshtea, &c., while immense tracts of virgin forests stand around almost untouched, except by the nomadic cultivator, who burns them down. It is evident that we should at any rate endeavour to obtain these supplies from local sources; and more than this, we should see whether these tracts of forest covered land may not also be turned into sources of profit by taking the timber to other than local markets.

120. By doing this the Forest Department is endeavouring to open out fresh sources of supply—a work just as important as the protection of forests—and also husbanding other resources.

It is hoped and believed that eventually the rich forests of Assam will be profitably worked, but there are very many difficulties to surmount.

A class of foresters has to be created. European enterprise in forestry has to be shown the way, and this must be done by Government taking the initiative. Success in a pecuniary point of view cannot be looked for from a first or second experiment; but gradually expense in bringing timber out will decrease, and it will be found that supplies from Assam can be profitably exported.

Cooch Behar.

121. As a considerable quantity of timber felled during previous years, and sleepers, remained in the forests, instructions were issued forbidding the felling of any timber during the year, and desiring that all work should be concentrated in bringing in the felled timber to station depôts. The Assistant Conservator was also desired to inspect all the places where stocks of timber were lying in the forest depôts and ascertain the quantity. This very necessary inspection was ordered in 1868-69, but was neglected by the officer who relieved Mr. Mann on his transfer to Assam (Mr. Oakley). He neglected it again in 1869-70. His supineness in this and irregularities in other matters caused his removal from the division, and he has since left the department. His successor, Mr. James, was instructed to verify the stocks of timber said to be lying in the forests. This has in a measure been done, but has not yet been completed.

122. More than usual difficulty was experinced during the last season in obtaining carts for transport of timber, owing partly to their being employed in carrying the iron bridges for the Silligoree roads, as also for "metalling," and a large number of carts were employed removing timber from the Bycunpore forest, this being the last year before expiry of the lease which had been granted by the owner.

123. The following Statement shows the quantity of timber brought in :—

Sub-divisions.	To Station Depots.			To Forest Depots from forests.			Total.			Grand total.
	Logs.	Pieces.	Sleepers.	Logs.	Pieces.	Sleepers.	Logs.	Pieces.	Sleepers.	
Sikkim	7	.....	50	.....	222	1,506	7	222	1,556	
Bhútan	10	90	.....	2,717	349	11	2,727	439	11	
Total ...	17	90	50	2,717	571	1,517	2,734	661	1,567	4,962

124. The total of timber in the station and forest depôts is shown in Statement No. 25.

Losses of Timber.

125. The following losses have to be recorded for the past year. They are much to be regretted, and the more so as some of them were preventable if proper caution had been observed.

Three thousand sleepers were burnt at Sookna by a jungle fire in March 1870, but the number could not then be ascertained, and they were not therefore struck off stock last year. This loss might have been avoided had care been taken to cut the surrounding jungle.

One thousand four hundred and seventy-six sleepers were carried away in July 1870 by the strong floods on the Mahanuddy during the storms which then occurred. The sleepers had been carted close to the river-bank for a contractor who was at the time rafting and floating them, when the river suddenly, as often happens in the Mahanuddy, came down and carried away a large portion of the depôt in which the sleepers were stocked. Subsequently, after the river went down, many were recovered, but the Assistant Conservator has not furnished a statement in time to give the number here.

Eighty-eight thousand shingles, the remainder of a batch of 470,110 shingles which had been cut for Public Works Department in 1867-68, but which the Executive Engineer refused to take over, should now be struck off stock, as

they have been repeatedly offered for sale where they were lying, on the Rungbee road about four miles from Darjeeling, but no one would purchase them, and they are now useless.

They were not of much value, being those that remained after the good ones had been selected; but this loss would not have occurred had a written agreement been entered into at the time with the Executive Engineer, and the shingles been made over to the Public Works Department in batches of ten to twenty thousand, as the contractors who cut them would have been periodically checked, and the imperfect shingles rejected at the time.

126. It is somewhat unfortunate that soon after the Forest Department was introduced into Sikkim in 1866-67, and before experience had been gained by the forest officer appointed, who had never had any experience in forest matters, a large quantity of timber for the building of new barracks was required, and operations on a large scale were commenced for the felling and cutting of timber. The supply was obtained, but heavy expenses were incurred without written agreements and beyond necessary limits, the results of which are partly seen in the loss of the shingles now recorded.

127. The sales of timber during the year are shown in Statement No. 26.

128. Miscellaneous collections on bamboos, firewood, cattle-grazing, &c., amounted to Rs. 5,771 during the year, being an improvement over previous years.

India Rubber collected in Sikkim.

129. India rubber of very good quality was for the first time collected in this division in the past year. Collecting cost only Rs. 12 per maund as compared with Rs. 25 to Rs. 30, which is paid by the contractors in Assam. About 45 maunds will go down to Calcutta for sale. The sample sent to the brokers was valued at Rs. 45 per maund. Very good stick lac was also collected; and it is proposed to employ some one during the proper season to distribute the insects which produce it over the trees, with a view to increasing the produce.

Chittagong.

130. From the forests in Chittagong the following forest produce is recorded by the Deputy Commissioner as having passed the river toll stations during the year.

131. There is nothing to record regarding other divisions under this section.

Extract from letter No. 119 *of* 9*th June* 1871, *to the address of the Secretary to the Government of Bengal, Revenue Department.*

"Sir,

"As requested in your letter No. 1906, dated 25th May 1871, I have the honor to report on the timber operations being carried on in the Nambur forests, and also on those being carried on on the Deehing and Deebro streams.

"2. Operations were commenced on these streams in March 1870, agreements having been entered into with five Native contractors to fell and bring down logs to forest depôts on the streams at a rate of four annas per cubic foot.

"This rate was considered high, but as no operations of the kind had hitherto been undertaken, the cost of them could not be ascertained, and people were averse to beginning work at a lower rate.

"3. Up to the 1st of April the number of trees felled of various kinds, viz. Sam, Pomah, Urium, Nahor, Makai (good for shingles), have been on the—

	Trees.		Logs.
"Deebroo	50	or	150
"Deehing	284	"	734
"Dhunsiri, Golaghat	176	"	202
Total ...	510	"	1,086

"4. Of the 1,086 logs, 670 had been dragged to the banks of the rivers ready for floating down, and 416 remained still in the forests.

"5. Since that time an elephant has been at work on the Deching, and has dragged 60 logs, and 120 have been dragged to river by coolies.

"It is expected that the whole of the timber will come to depôts during these rains. The rivers have begun to rise, and the timber is now being brought down to depôts. At Deching depôt 129 logs have already arrived, and have been dragged up into the forest depôt by elephants.

"6. The elephants here referred to are three, which have been purchased out of eight sanctioned. As inspection of forests by officers was over for this season, I took the opportunity of putting the elephants to work on timber, and I am glad to state that they are doing this work well and beyond my expectations. As soon as proper sample dragging gear has arrived from Rangoon, from which sets will be made here for the use of the elephants, they will be able to work much more effectively, and with less risk of injury, as they now draw from a pad on the back, which is likely to cause hurt, all the weight coming on the backbone; whereas by a flat hemp breast-band, as used in Burmah, where timber dragging is carried on to perfection, the weight comes in front, and does no injury, besides giving the elephant a much better 'purchase' for his work.

"The last reports just received lead me to expect that fron
rate will be reduced to two annas or one anna and six pies per cubic foot. The reports say labor can be commanded at very low rates, viz. three annas per day for a coolie and four annas per day for a rough carpenter, and that the villagers in the neighbourhood seem disposed to enter into the work and to carry it on even through the rains.

* * * * * * * *

"10. If this be found practicable, the forests of Assam may yet be found remunerative.

"11. In opening out operations of this kind as a tentative measure, there must be always more or less expense incurred and risk as regards final success; but I am inclined to think that with care the work now going on will be found to be profitable and advantageous, as supplying the demands for timber, and giving data upon which to form opinions as to the advantges of using steam power hereafter."

SECTION V.

FINANCIAL.

132. The financial results of the past year would, so far as receipts and expenditure alone are concerned, have contrasted favorably with the previous year, inasmuch as the deficit is much less; but the difference in the value of timber in hand in 1869-70, and the present year, amounting to Rs. 18,783, against the year, renders them still unsatisfactory. This arises chiefly from the following causes.

1*st.*—Increase of expenditure on account of establishment without any increase of remunerative works, which have to be carefully considered, and which officers new to divisions and kind of work cannot be entrusted with, particularly in these provinces, where almost all accessible and remunerative timber has disappeared, and to remove that which now remains is very costly.

2*ndly.*—A large quantity of timber has been struck off stock in hand, owing to losses the value of which, estimated at former years' rates, amounts to Rs. 11,309-12. The causes of the losses are explained in Section IV.

3*rdly.*—Besides this, the amounts realized by sale have been at much lower rates than those estimated for the timber, owing to the timber latterly brought in having been found to be very inferior to that formerly sold.

133. This is the result in great measure of overwork at the commencement of the operations in Sikkim, which have already been commented on. The work was too extended to be properly supervised, and the Assistant Conservator, then newly appointed, committed the error (common to all who have had no experience) of cutting timber without considering cost of removal, believing he had done a great work when the timber was felled, whereas it had better have remained standing in the forests. Operations in Sikkim were checked in 1868-69, and as shown at paragraph 27 of last year's report, no timber was felled during the year, operations being confined, as they have since been, to removal of timber previously felled.

134. A large portion of the sleepers, which have latterly been carted in from the forest depôts where they were lying, were found to be very inferior, and had to be sold at greatly reduced rates, rather than let them lie at depôts where they must deteriorate in value every month.

Many of the logs, too, brought in and sold were not such as should have been felled, and they had to be disposed of at very low rates. (*Vide* statement No. 26.)

135. Referring to remarks made in Section IV, regarding two seasons having passed without verification of the stocks said to be lying at forest depôts, it must be recorded here, though with very great regret, that it has been found, on bringing down timber reported as being at forest depôts (that is intermediate depôts where timber can lie in safety, and from which it can be easily taken to station depôts for sale), that the timber was still lying on the spots where it was felled. This would have been discovered long ago had the Assistant Conservator, who has since resigned, taken care at once to visit all localities where stocks of timber were said to be lying, as he had been instructed to do during the cold season of 1868-69. The forester who had charge of most of the work under Mr. Mann has been ordered down from Assam, and the matter will undergo investigation, as charges were made for removal of timber which, it now appears, was not removed.

Results of the Year.

136. The results of departmental operations during the past year are—

	Rs.	As.	P.
Collections by officers of the department	61,143	6	6
Forest produce collections by civil officers	58,534	2	5
Total ..	1,19,677	8	11

Deduct.

	Rs.	As.	P.			
Charges of the department	84,359	9	10			
Difference between assets and liabilities	13,820	5	0	98,179	14	10
Showing a total profit on the year's operations of				21,497	10	1

Full Collections not entered by Civil Officers.

137. As regards the collections made by civil officers, it would appear from the statements received, both from the Accountant-General and the Board of Revenue, which do not agree, that the civil officers have omitted several items of receipts, which in previous years have amounted to between twenty and thirty thousand rupees more than are shown this year. The Accountant-General's statement this year shows Rs. 58,534, as compared with Rs. 73,552 in 1869-70, and Rs. 53,362 in 1868-69. The amount therefore is subject to correction so soon as replies have been received to inquiries which have been instituted.

138. It is advisable, as has been remarked in Section VI, paragraph 156, that copies of the forest revenue statements prepared by civil officers should be sent direct to the Central Forest Office for scrutiny. If this were done, the revenue could be closely watched by the Conservator, and future discrepancies might be avoided.

SECTION VI—GENERAL.

Forest Rules for Lower Provinces.

139. Rules for the management of the forests in the Lower Provinces, sanctioned by the Government of India in notification dated 16th February 1871, were published in the *Calcutta Gazette* of 1st March 1871, and became law.

140. They have not yet, under rule 1, been extended to any of the divisions; but all Government forests already notified as such are under their provisions (*vide* rule 2) and subject to the authority of the Conservator.

141. These rules are the first under Act VII of 1865, which clearly recognize two distinct classes of forests, namely Open and Reserved forests. This point was not secured until after considerable discussion, but is very necessary to meet the present state of the forests in the provinces, as also the requirements of the many different tribes—some of them wild tribes—who inhabit many of the forest tracts. This division of Government forests into Open and Reserved forests enables us to set apart, for partial protection, large tracts which have originally been covered with heavy forests, but have been denuded in great measure of their timber by cultivators and timber cutters, and will recover themselves if the felling of saplings is prohibited. They are such as are best situated for the extraction of timber, as evidenced by their being first cleared, and are within reasonable distance of markets. Within these tracts the Forest Department has, under rule 13, authority only so far as the protection of Reserved trees is concerned, but can from time to time, after

selection has been made, declare any portions Reserved Forests. To have recognized only Reserved Forests under the rules would have rendered any protection over still existing forests impossible for a very long time, as survey and demarcation under part II would have been a work of many years, and would have put Government to a very heavy expense for boundary marks, which will only now be necessary in comparatively few cases. A copy of the rules is attached as Appendix to this report.

142. The establishment was increased during the past year by the addition of four Assistant Conservators to take charge of the so-called Bhaugulpore division, also Chittagong, Lower Assam, and Dacca divisions, and sanction was given to an establishment of all kinds up to Rs. 3,420 per mensem in Financial resolution No. 2014, dated 8th July 1870.

143. The distribution of establishment under this sanction has since been approved by the Government of India, *vide* No. 290F, dated 2nd May 1871, and takes effect from 1st June 1871, time being thereby given to effect transfers and give reasonable notice to those persons whose services have to be dispensed with under the new distribution.

144. It will be observed that there are no Deputy Conservators on the staff. When first the Conservator joined the Lower Provinces, little or nothing was known of the forests. The very existence of any, except in Assam and Bhútan, with protection, was uncertain; and it was deemed advisable, while mere exploring was going on, not to put Government to large expenditure on account of establishment. Thus it has happened that no Deputy Conservators were appointed. This economy was perhaps a mistake, though seeing the indifferent progress that it has been possible to make up to this time owing to many impediments, not at once surmountable, a mistake need scarcely be admitted; but the time has now come when an exchange of young Assistants must be made for Deputies of real experience to take charge of Assam and Cooch Behar, for instance, and manage all local details without direct orders in every instance from the Conservator, who cannot remain long enough in any one division to become sufficiently acquainted with all local detail to enable him to develop the full resources of the forests, and suggest every detail as to the best way of collecting revenue or working out timber. Efficient lieutenants are necessary, and will now be obtained.

145. Statement marked B gives the distribution of establishment in the several divisions hereafter detailed, as also the length and breadth of the charge, together with the area of forests in each, so far as it is at present possible to state it.

146. It will perhaps be useful here to give a comprehensive sketch of the present position of the Forest Department in the Lower Provinces of Bengal, together with remarks which may give some idea on the general question of forest conservancy in these provinces.

Forest Divisions.

147. The forest divisions are at present five in number:—

1.—The Assam division, containing the sub-divisions of Upper and Lower Assam.

2.—The Cooch Behar division, containing two sub-divisions, Sikkim and Bhútan.

3.—The Chittagong division.

4.—The Bhaugulpore division, which includes forests in the Patna and Chota Nagpore divisions.

5.—The Dacca division.

General Sketch of Present Position of Department.

148. The present position of matters in each of these charges is as follows:—

In Assam a general inspection of the forests has been made, and certain tracts have been selected for notification as Government forests. The boundaries of the tracts, however, have not as yet been sufficiently defined to enable the Commissioner of the division, to whom a general proposition was submitted, to approve them, and the Deputy Commissioners of districts have now been applied to to assist in further defining the tracts with a view to their being notified in the *Gazette*. The revenue survey maps of the country not being complete, and those which show the forests being unfortunately the last to be published, it has been impossible accurately to define the forest tracts by description supported by maps, and delay is therefore caused. The boundaries now being prepared will, it is hoped, satisfy the Commissioner.

149. Up to the present time, therefore, with the exception of the Nambur forests made over to the Forest Department by the Commissioner in January 1869, this department have no authority, under the forest rules, in any forests in Assam. The boundaries of the Nambur forests have not yet been defined, as no survey has yet been made.

Extract from a letter from the Officiating Commissioner of Revenue, to the address of the Secretary to the Board of Revenue,—(No. 182, dated 16th March 1863.)

In the other three districts, Nowgong, Durrung and Luckimpore, instructions have been issued to the Deputy Commissioners to call upon the fiscal officers in charge of mouzahs where valuable timber is known to grow in any abundance, to bind themselves to protect the forest from spoliation, and to allow no full-sized trees yielding valuable wood to be felled without payment of the following rates, and no young trees of the kind referred to to be cut at all.

	Rs.	As.	P.
Trees called tila sopa and all that are fit for boat-making, length from 16 to 18 yards, at	4	0	0
Ditto ditto, from 12 to 14 yards	2	8	0
Trees that are fit for boats, not of the above description, from 13 to 16 yards ...	3	0	0
Ditto ditto, from 12 to 14 yards	1	8	0
Trees of hard wood, such as Nabar, Jack, &c., fit for large posts for house-building, from 4 to 5 feet in girth	2	0	0
Ditto ditto small, 3 feet	0	8	0
Trees that are fit for beams for houses (small)	0	2	0
Ditto ditto small (narrow) planks	1	0	0
Ditto ditto broad	1	8	0

Memo. No. 508.

Copy forwarded to the Deputy Commissioner of Durrung for information and guidance, who is solicited to act upon the orders above alluded to.

By order of the Commissioner of Revenue.

Revenue Commr's. Office; Assam, *The 20th March* 1863. — D. Bruce, *Head Assistant*

150. Revenue is collected on timber under order of the Commissioner of Revenue dated 20th March 1863, copy as per margin, and also on India rubber, stick lac, Soom forests (Machilus Odoratissimus), on which silk-worms feed, &c., by the Deputy Commissioners of the districts, and the amounts so collected are finally incorporated into the provincial accounts as forest revenue, but distinct from departmental operations.

151. Pending the notification of Government forests in the *Gazette*, timber operations were this year opened out on a small scale as a tentative measure on the Debroo, Dehing, and Dhunsiri rivers. These operations have already been detailed in Section IV.

152. The India rubber supplies from Assam might, from a yearly outturn of some 5,000 to 6,000 maunds (a large portion of which, however, is probably collected beyond the British frontier), valued at two to two and half lacs of rupees, be increased to almost any amount in the course of a few years, if liberal grants for improvement, and increase of the forest, were judiciously applied for the purpose. Proposals for the management and increase of the India rubber forest have been lately submitted to Government for orders, and are under consideration.

153. The silk industry, it is feared, is declining, owing to the introduction of cheaper European fabrics, which the natives are adopting, and against which, as regards price, the silk textures cannot compete. But a considerable revenue is still derived from these forests, which are let out for silk-worm feeding. In 1869-70 this amounted to Rs. 30,720 in Luckimpore and Seebsaugor. A short note on the subject of silk-worms will be found in Appendix C attached to this Report.

154. The trade in shell lac might be enlarged indefinitely.

155. All these sources of revenue, as well as the local timber trade, could be made to produce a very considerable revenue if carefully looked after and stimulated; but this cannot be done by the civil district officers, who at present collect this revenue. Their time is occupied early and late in other important matters. These sources of revenue require the care and attention of a special establishment all over the country, with a sufficient staff to control the receipts, a considerable portion of which, there is room to believe, sticks to the pockets of mouzadars and other collectors, who receive a percentage on the amounts collected, or is not collected at all, as is evidenced by the paltry revenue shown as receipts. The revenue alone on timber for the thousands of boats made every year would be considerable if the rivers down which they are brought were watched or commanded by toll stations.

156. The Forest Department has not up to the present time been in a position to take over charge of this revenue, and it is doubtful whether it would be advisable that it should, except in the case of collections on account of timber, as jealousies might arise which would lead to difficulties, and the discretion of local forest officers cannot always be depended on; but certainly the Forest Department ought to have the returns of all such collections in detail under distinct heads sent to the Accounts Office monthly or quarterly, so that a close watch may be kept over them, and causes of decrease looked into, while means of improving receipts may be considered. These miscellaneous receipts are the backbone of the forest revenue in the country, and would form a very important item of revenue if properly attended to. How far the Forest Department should interfere in collecting it, it will be for Government to decide hereafter; but it certainly should not be considered as revenue apart from the Forest Department. At present the department takes no credit for anything but sums received on timber brought out by the department and sold by it. These operations have been very trifling up to the present time. All expenditure of an unproductive kind for protection of the forests, plantations, stock of kinds, &c., is debited to it. Under these circumstances, while almost all revenue the collection of which costs little or nothing is cut off from the credit of the department, it has all the expensive machinery attached to it placed at its debit. That a yearly deficit should be recorded is therefore no wonder, and the financial position of the department should not be judged of apart from all receipts derived from forests which, when added together, show a yearly surplus. A small increase of establishment would enable the Forest Department to collect all forest revenue apart from the civil officers; and as they cannot devote time to looking into the detail of the sources of such revenue, while doing so should be a special subject of attention by the forest officers whose work lies entirely in the districts, there is every reason to believe that departmental agency in this matter would result in a great increase of revenue, provided this agency tempered zeal with discretion, and maintained close communication with the district civil officers—a point insisted upon in all instructions given to forest officers, who are perhaps rather too much inclined to be too departmentally exclusive and independent.

Tea Cultivation in Assam.

157. Tea cultivation in Assam has yet to be mentioned.

This cultivation has a future in Assam, and all along the line of the North-Eastern Frontier as far as Nepal, which will probably, ere many years are passed, almost oust China tea from the Home markets. Tea is being grown over many parts of India; but here, by reason of climate, due to peculiar situation, it will probably be found that tea cultivation will chiefly flourish and be a success.

158. The following quotation* from a letter written by a thinking and able man, at present a tea planter in Upper Assam, is worth attention, and is therefore attached here.

* Appendix D.

Tea cultivation in Assam now yields nearly 70,000 maunds of tea per annum. That this produce will be doubled in the course of a very few years if encouraged, there can be little doubt; and as each maund of tea requires a cubic foot of timber to pack it in (*i.e.*, 1,400 tons of timber a year), each acre of tea requires 1½ maunds of charcoal to manufacture it, and an acre of ordinary forest produces only about 66 maunds of charcoal. Supposing the forest to reproduce itself fit for cutting in ten years for this purpose, as only small wood is used, something like 27 square miles of forest are perpetually required to furnish charcoal for the present manufacture of tea alone.

159. Here it may be remarked that a supervision of the scattered forests in the plains is necessary, though most people (as is generally the case with regard to forest questions,) think that the forests are so inexhaustible as to render any attention to them unnecessary. The Government of India, in paragraph 6 of their review of forest report for the year 1869-70, remark as follows:—

"The exhaustion of the forests near some of the great tea plantations is also noticed, as well as the fact that planting operations have been undertaken by the Assam Company to provide themselves with charcoal. It may be advisable not to interfere too much as regards petty details with the supply of timber for the general wants of the great tea companies in Assam, but the above remarks show the necessity of exercising due control over their operations in the forests. It is to the interests of the Companies themselves, as much as those of Government, that the supervision of the State over the working of the forests should be more than a nominal one; while for the benefits of this control the Companies must be prepared to pay, in the shape of a royalty, on the timber used by them."

160. These remarks are true. Suitable tracts for tea planting are not so extensive as is supposed. Tea planters require land with forest upon it, not only because forest-covered land, when cleared, is the richest, but because a proportion of forest is required near at hand for charcoal. This renders selection of such tracts as should be retained for tea planting necessary. In these tracts jooming should be checked gradually, but steadily, and at once. There will be plenty of other tracts available for these wretched cultivators. The subject of jooming has been remarked on in Section I.

161. The province of Assam extends over 30,000 square miles of country The richness and quickness of its vegetation is probably unsurpassed anywhere in the world. It contains mountains and plains capable of producing almost any variety of tropical produce; but its population is so scant and poor, that it must be long time before its riches can be developed.

162. The forests of the country are numerous, and contain very large stocks of mature timber. The rivers, which take their rise in the ranges of hills north and south of the Assam valley, and empty themselves into the Brahmapootra, afford every facility for bringing down timber in almost any quantity; but unfortunately the valuable timbers do not float, and thus there is great difficulty and expense attending the removal of the timber, the price of which is regulated by what it will fetch at Calcutta, where the market is kept well supplied by sea, from almost all parts of the world, at a reasonable rate. It is this which so greatly detracts from the value of all forests in the Lower Provinces. Still, however, it is believed that the immense stocks of timber in Assam could be profitably worked out if suitable measures were sanctioned. The use of steam machinery would be absolutely necessary, as also an experienced local forest establishment.

163. It is unnecessary here to go further into this subject. The whole matter is one which requires much more information than we at present possess. The result of the work now going on will go far to clear up the question of available labor, which is the most important point.

Cooch Behar Division.

164. In Sikkim the tracts of Government reserved lands and forests contain 44,800 acres, scattered over an area of about 700 square miles. These have been notified in the *Gazette*.

Bhutan.

In the Bhútan sub-division the areas set apart for Government forests cover an area of 448,000 acres, in a country extending over an area of about 30,000 square miles.

Timber operations have been carried on almost the whole length of the division—from Darjeeling, where heavy timber was felled in 1866 and 1868 for barrack building, to Buxar in the Western Dooars.

165. These general operations have been stopped, and it is proposed in future to confine them to one locality in each sub-division; but there is a large quantity of timber felled which has still to be brought to station depôts and sold. This is being steadily done, and it is hoped that Europeans acquainted with forest operations will eventually be prevailed on to purchase the timber as also to bring it out. Arrangements in that direction are now being made with reasonable hope of success.

166. The work to be done in this division is very heavy. Most of the forest reserve boundaries have to be properly demarcated in a permanent manner. They should be gone over every year to see that they are not intruded on. The tracts have yet to be departmentally surveyed and valued. Plantations should also be proceeded with.

167. The protection of the forests in this division is very difficult. The forest localities are perhaps the most pestilential to be found anywhere. They are many of them inaccessible during the rains except to timber thieves; and they are traversed in Bhútan by such a number of rivers running through the neighbouring state of Cooch Behar, down all of which timber can easily be taken and sold, that a large establishment is necessary to do the police work of the department. An insufficient and weak establishment here can only end in disappointment, and defeat the objects sought, *i.e.* protection of the forests. The mischief and depredation which can be carried on unobserved for years in forests which cannot be be inspected every year, yet from which produce can easily be taken down to market, may not be discovered for a long time. A native watcher will report everything going on well until a European going into the tracts discovers the mischief and robbery which has occurred. It would be better to abandon many tracts altogether, and confine protection to a few, well looked after, than pretend to protect numerous tracts with an inefficient establishment, which only brings all management into contempt.

168. Every river in Bhútan requires its watchers, and the assistance of local police to give information.

Timber operations in this division can be rendered profitable if European permit-holders, who understand the bringing out of timber and have ready sale for it, can be introduced into the forests; but unless this can be done it will be advisable to restrict operations to supplying local wants, deferring more extended operations until means of transport have improved, and local demands for making a railway render it advisable under the managment of a Deputy Conservator of experience to increase them.

169. In the meantime there is very much to do in bringing this division into proper order and in collecting the local revenue, which can be much improved by care and watching.

CHITTAGONG DIVISION.

170. In this division an area of 5,670 square miles has been set apart and notified as Government forests (*vide* notification dated 27th January 1871), and two tracts on the Kurnafoolee, containing 966 square miles, it is proposed to set apart as Reserves. Only a small portion of these areas has yet been inspected.

171. The forest revenue here is collected at river toll stations, which were taken charge of by the Forest Department on the 1st of April 1871. The revenue is received in cash before the produce is passed. Permits are given to the "Capitans" of gangs of wood-cutters, who go up to the forests to cut timber, and certain restrictions as to size of timber to be felled are entered on the permits.

Undersized timber will be confiscated at the toll station.

172. These "Capitans" pay a fee of Rs. 10 for registration of their hammer mark, and 8 annas a head for each coolie who accompanies him to go up and fell or purchase timber, before he has a permit given to him. As he goes up the rivers, he is compelled to report himself at the chief civil station on the way, and show his permit before he is allowed to proceed.

173. This system, it will be observed, can scarcely be called forest conservancy; but it was not deemed advisable at once to upset a system which had been going on for years, as the hill tribes require careful handling. This system has at least the advantage of rendering collection of revenue on forest produce easy, and the amounts now collected are considerable. Much of the timber brought down comes from immense distances above where it would be possible to carry on forest conservancy. Indeed, the tracts within what may be called the line of real British influence have in great measure been worked out wherever the timber was easy of access from the rivers. So far as present reports go, the increased rates of toll sanctioned by Government in letter No. 367, dated 27th January 1871, are being levied with less grumbling than might have been expected; but it has been necessary to employ the whole establishment sanctioned for the division to look after the collection of the revenue.

174. There is therefore no establishment yet in charge of the forests or proposed Reserves, and the only protection they are getting is the prohibition as respects the felling of undersized timber.

175. This in the first instance is perhaps as much as can be or ought to be done.

176. In the proposed reserved tracts above named, hill cultivation is not carried on; but in the other tracts it has not been deemed advisable to interfere at present with the tribes who inhabit them.

177. Felling of timber, when commenced, will be carried on under a conservancy system departmentally.

Perhaps the greatest real destruction that takes place in a forest is the felling of hundreds of young saplings for rollers, &c., to remove one tree. But such destruction is inevitable, if the work is done by coolie labor: hence the absolute necessity for the introduction of elephants, where practicable, for the extraction of timber. Wherever it is proposed to fell timber, an establishment of elephants should be ready to do the work.

Bhaugulpore Division.

178. As regards the Bhaugulpore division, there is at present only a small office establishment. This forest division, so far as Chota Nagpore is concerned, was inspected last year; and the Sarunda forest in Singbhoom, of which Government is the zemindar, promises large supplies of Sâl with good river carriage for transport of timber. Inquiry is now being made as to the routes by which timber can be brought, and markets for sale, together with cost of working and value in markets.

Dacca Division.

179. The Dacca division is known to contain vast forests containing much the same varieties of timber as are found in Assam. Revenue is at present collected under the civil officers at the Sealtekh river toll station. The district has not yet been visited by a forest officer, and it will probably be better to let the temper of the wild tribes all around calm down before any conservancy measures are taken.

Duties of a Forest Department.

180. From the foregoing it will perhaps be gathered that the duties which properly form part of the employment of a Forest Department should not be only felling of timber for sale from a few reserved forests or rivers, and the protection of certain forest tracts from destruction, supplemented by the making of a few acres of plantations every year.

181. Thus far forest conservancy has been treated from a departmental point of view; but there is another view which may with some reason be maintained, for the Lower Provinces of Bengal are peculiarly situated as regards supplies of timber.

General Remarks.

182. Calcutta and neighbouring markets are supplied by sea from all parts of the world, and the prices of timber are regulated by these markets.

183. Districts up-country are supplied for the present either from Calcutta or Nepal, as they contain no forests, and plantations cannot yield supplies from eighty to a hundred years; other divisions, such as Assam, Cooch Behar, Dacca, and Chittagong, contain forests enough to supply timber for all local purposes.

184. Under these circumstances it may be asked whether it is necessary to maintain a large forest establishment to watch over the forests. Could not the civil authorities collect all revenue on forest produce at little cost for extra establishment?

Might not revenue on timber in Assam and Cooch Behar, for instance, be collected at toll stations on rivers, like in Chittagong and Dacca, and only such forest officers be retained in the Lower Provinces as are required to carry on the plantations which Government may decide on establishing up-country? Such remarks may with some show of reason suggest themselves to many. This is not, however, the place to enter into a discussion on the subject. The whole question of forest conservancy in Lower Bengal will, it is hoped, shortly become subject of consideration by a competent committee, who will decide the position and duties of the Forest Department.

185. It has not been possible hitherto to propose the appointment of such a committee, as until lately sufficient information had not been gained to make it advisable to do so; but the time has now come when the Conservator is sensible that the views he may have formed should be subject of discussion by those who are authorized to decide upon the future operations of the Forest Department in Lower Bengal, and application will be made to Government for

the appointment of a committee of forest officers, of whom the Inspector-General will form the head, joined by Commissioners of divisions, which will be able to consider separately what course should be finally adopted in each division, a final report being submitted to the Government of Bengal for review.

Conservator's Tours.

186. The Conservator visited the following districts during the year:—Sikkim in May and June; Chittagong in August; Bhútan (Julpigoree), on the transfer of officers to different divisions, in October; Chota Nagpore (Palamow), in company with the Assistant Conservator, in December and January; Assam during March, April, May, and part of June, being detained there in charge of the Assistant Conservator's office, as Mr. Mann had gone home on sick leave, and a relieving officer did not come to Assam till late in June.

187. The establishment underwent several changes during the year. Messrs. James and Thomas, formerly in the police, joined the department in July 1870; Mr. Oakley resigned his appointment in January 1871; Mr. Mann went on sick leave to Europe in March; Captain Losack joined the department from Oudh in December 1870: the officers were therefore all new to their work and districts, which detracted from their efficiency during the past year, and renders it impossible for the Conservator at present to express any opinion as to their several merits. He would, however, record his thanks to Captain Losack for the zealous and cheerful manner in which he has at once shown himself to enter into the work he has been placed in charge of.

APPENDIX A.

Forest Rules.

Rules for the better management and preservation of the Government Forests in the Lower Provinces of Bengal.

PART I.

Preliminary.

These rules shall be in force in those tracts of land which may be declared to be Government forests under Act VII of 1865, and they shall regulate the transit of timber and other matters in those districts to which these rules may be extended by an order of the Government of Bengal published in the *Gazette*.

2. On any tract being declared by notification under section 2, Act VII of 1865, to be subject to the provisions of that Act, it shall be subject to the authority of the Conservator of Forests under the following rules Provided that the Government may appoint any person other than the Conservator of Bengal Forests to be Conservator of any specified tract.

3. Divisions and sections of Government forests will be placed under the management of Deputy and Assistant Conservators, as may be determined by the Government of Bengal.

4. All officers charged with the protection and management of any Government forests, or with the control and management of any matters to which these rules relate, will be designated forest officers.

5 The Government forests, as notified under section 2, Act VII of 1865, shall be marked on a copy of the revenue survey map of the district, which shall be deposited in the office of the Commissioner of the division, and attested by his signature.

6. There will be two classes of forests—Reserved and Open; and whenever any notification is issued under section 2 of Act VII of 1865, rendering any land subject to the provisions of that Act, such notification shall state whether such land is to be a reserved or an open forest.

PART II.

Of Reserved Forests.

7. The reserved forests shall consist of tracts or forest of waste lands, the soil of which is the property, and is in the possession of Government, which may be set apart as such by order of Government, and defined by notification in the official *Gazette*. The Conservator of Forests and his subordinates shall have entire administration, custody, and control over these forests and their products.

8. Within reserved forests no tree of any kind is to be felled, nor shall any forest produce be removed without general or special authority obtained from the Conservator of Forests.

9. The boundaries of these forests must be clearly marked off by substantial marks where no natural boundaries exist. Should villages be included within these tracts, the boundaries around the village lands must be demarcated in the same manner as the forest, subject to the proviso in section 2, Act VII of 1865.

10. Whenever the Government may resolve to set apart any tract as a reserved forest, the privileges which villagers are to be allowed to enjoy, and any customary rights which may belong to them in the matter of providing themselves with firewood and wood for domestic and farming purposes and otherwise, shall be distinctly defined and approved by Government. It shall not be contempt to the Conservator in any way to restrict or modify privileges so allowed, except with the approval of Government.

11. As soon as the notification required by section 2 of the Government Forest Act, stating that the forest is to be a reserved forest, is published in the *Gazette*, a notification shall be published and issued to the villages around, mentioning the boundaries of the tract reserved, warning the villagers against trespass or mischief, and defining the restrictions imposed on them, and the privileges allowed to them, within the reserved forest under this section. This notification will be issued by the district officer, and a copy will be sent to

the forest officer for information. The Conservator will, nevertheless, be careful to give prompt attention and consideration to any complaints which may subsequently be preferred, to the effect that the restrictions so imposed infringe rights of, or inflict hardship upon, individuals or communities.

12. The Conservator of Forests may prohibit all persons from passing through a reserved forest, except by the authorized roads or paths, of which a list shall be published, drawn up by the Conservator in conjunction with the chief civil authority.

PART III.

Of Open Forests.

13. The open forests shall consist of such tracts of forest or waste land notified under section 2, Act VII of 1865, as may not by special notification be included in the reserved forests. In these tracts the authority of the Forest Department shall extend only to the protection of such reserved trees as may from time to time be notified with the approval of the local Government.

14. Within the limits of open forests, and subject to the proviso in section 2, Act VII of 1865, no person, without the permission of the forest officer, may mark, cut, girdle, or fell, or in any way injure any tree of the kinds which may be reserved as aforesaid.

15. Until the Government forests to which these rules shall be applicable in any district are settled and defined under section 2 of the Act, no lands in the district which are covered with trees, brushwood, or jungle, and after the forests shall have been defined, no such land in the open forests shall be sold, nor shall grants or leases in such lands be given, except under the orders of the Commissioner, who should, before passing final orders, communicate with the Forest Department; and in case of difference of opinion between him and that department, refer the question to the Government.

16. In addition to the reservation of the trees of the kinds which may be notified as reserved under rule 13, it shall be competent to the Conservator of Forests and his assistants to prohibit the felling, cutting, or otherwise using trees of other kinds which they may have marked or girdled within the open forests.

17. No other restrictions shall be imposed by the Forest Department in regard to the open forests, except after the publication of notifications with the approval of the Government.

18. Should the Conservator think it desirable to impose any further restrictions than those above specified in any open forest, he shall, in the first place, communicate his proposals to the Commissioner of the division, who shall give his opinion on the subject. Before approving of any such proposals, it will be the duty of the Commissioner of the division to satisfy himself that the proposed restrictions will infringe no rights or privileges which should be preserved, and to define precisely any privileges which should be kept intact. On receipt of the proposals as agreed upon between the Conservator and Commissioner, the Government will sanction the issue of notifications imposing such restrictions as it may see fit.

PART IV.

Of the Use of Streams, of Marking-Hammers, of Timber in Transit, and of Drift Timber.

19. A list of rivers, streams and waters in each district to which these rules may have been extended, which must be kept open for the passage of timber, will be made by the Forest Department in conjunction with the civil officers of the district, and be published for general information; and it will be the duty of the civil officers to see that these streams, rivers, or waters are kept open.

20. No timber, the produce of any Government forest, found adrift or stranded in any river, stream, or water of any district to which these rules may be extended, shall be marked until disposed of by the Forest Department; neither shall any mark on it be defaced. It shall not be converted or cut into pieces, neither shall it be removed or disposed of in any way without the orders of the forest officer, except on an order or decree by a competent court.

21. All timber disposed of by the Forest Department must be stamped by the Forest Department with such marks as the Conservator may direct.

22. All brands, or marking-hammers used in the marking of timber, must be registered in the principal Forest Office of the division in which they are to be used. A fee of Rs. 10 must be paid for every mark registered, and a certificate will be granted on payment of fee.

23. The use by any private person of any Government timber mark, or of any other timber brand or mark, save the one registered in his own name, is prohibited.

24. All foreign timber brought into British territory shall be reported and stopped at such stations as the Government of Bengal may from time to time direct, and such timber shall not be allowed to pass until it has been examined. The persons in charge will receive a pass in the form shown in schedule A, and the timber will be liable to detention, if found afterwards without a pass in any district to which these rules are extended.

25. All timber found adrift or stranded in the rivers, streams and waters of any district to which these rules may be extended, and which is the produce of any Government Forest, will be considered the property of Government, unless proof of ownership be given.

26. Persons who may have saved such drift timber are required to deliver the same to such persons as are authorized by the Conservator of Forests to receive it, on receipt of such salvage rates as may be approved by the Government of Bengal.

27. The forest officers shall take possession of any drift timber found in any river or stream, or lying in the bed of any river or stream within any district to which these rules may be extended, as to the ownership of which there may be any doubt; and the same shall be treated as drift timber under rules Nos. 28, 29, 30, 31, and 32 below.

28. All drift timber collected by forest officers shall be stored at such depôts as the Conservator of Forests may from time to time order to be established.

29. From time to time, as the collection of drift timber may render it advisable, public notice, inviting claimants to the ownership of such drift timber to come forward, will be issued at the chief stations of the district, and in the nearest town to the place or depôt at which such drift timber may be lying. These notices shall state the number and description of logs collected.

30. Six months' notice will be given for the reception by the forest officer, by whom the notice was issued, of claims to drift timber, after which, if not claimed, the timber will be sold on behalf of Government.

31. Claims to drift timber must be sent to the forest officer by whom the notice was issued, with particulars of marks by which it may be recognised. The said forest officer will inquire into the claim. If the claim be a single one, he may, on being satisfied of its validity, release the timber after expiration of the term mentioned in the notice. If the claim be a disputed one, he should endeavour to obtain the formal consent of the claimants to his arbitrating on their claims. Where the dispute cannot be so decided, and there exists any reasonable doubt as to the rightful owner, the forest officer will retain possession of the timber until the question of ownership be decided by the civil court having jurisdiction in the case: Provided that if no claim be preferred in such court with two months from the date on which the forest officer shall declare his inability to settle the dispute, the timber may be disposed of by the forest officer on account of Government.

32. Timber awarded to claimants must be redeemed by payment of the salvage rates approved by the Government of Bengal, and other expenses which may have been incurred on account of such timber.

PART V.

Of the Prevention of Offences and of Punishments.

33. It shall be the duty of all forest officers to see that these rules are not violated; and should they in any case be infringed, to arrest the offenders and convey them without delay to the nearest Magistrate or police officer in the division or sub-division in which the offence took place.

34. Any person infringing any of these rules shall be liable to be punished by fine not exceeding Rs. 500, or, in default of payment of such fine, by imprisonment for such term as is mentioned in the 6th section of the Indian Penal Code. But no fine shall be imposed in addition to the confiscation of any timber or other forest produce, or of implements, which may have been incurred under Act VII of 1865.

35. Any marking-hammers or other tools or implements, boats, carts, and cattle used in an act which constitutes an offence against these rules, and all timber that has been marked or obtained in a manner contrary to these rules, or that has not been reported and passed in

accordance with these rules, whether entire, or cut up, or sawn up, may be seized by an officer of the Forest Department, or police officer, and such tools or implements, boats, carts, cattle and timber may be confiscated by the orders of the Magistrate of the district.

SCHEDULE A.

Form of Pass for foreign timber imported into British territory.

NUMBER.	DATE.	OWNER OR CONSIGNEE.	PLACE OF DESTINATION.	DESCRIPTION OF TIMBER.	TIMBER MARKS.	NUMBER OF LOGS OR PIECES.	TOTAL.

APPENDIX B.

Forest Department, Bengal.

Scale of Establishments, exclusive of Officers, in the different Forest Divisions of Lower Provinces, Bengal, as sanctioned by the Government of India in No. 290F, dated Simla, 2nd May 1871.

Description.	Amount of Salary.	Remarks.
Cooch Behar Division.	Rupees.	Area of division—
1 Writer	70	12,169 square miles.
1 Office peon	6	
Forest Conservancy Establishment.		Area of Government forests—
1 Forest ranger, 2nd class	50	Sikkim 70 (Reserved) square miles.
2 Foresters, 1st class, at Rs. 20 each ..	40	Bhútan 700 square miles proposed.
2 „ 2nd „ at „ 14 „ ..	28	Total 770 „ „
11 Watchers, at Rs. 7 each	77	
Total ..	271	
Chittagong Division.		Area of division—
1 Writer	70	14,428 square miles.
1 Office peon	6	
Depôt Establishment.		Area of Government forests—
Kurnafoolee { 1 Forester	25	Open .. 4,704 square miles.
Kurnafoolee { 4 Watchers, at Rs. 7 each..	28	Reserves.. 966 „ „
Sungoo .. { 1 Forester	15	Total .. 5,670 „ „
Sungoo .. { 2 Watchers, at Rs. 6 each..	12	
Matamoree { 1 Forester	15	
Matamoree { 2 Watchers, at Rs. 6 each..	12	
Baghkhalee { 1 Forester	15	
Baghkhalee { 2 Watchers, at Rs. 6 each..	12	
Haldah .. { 1 Forester	15	
Haldah .. { 2 Watchers, at Rs. 5 each..	10	
Fenny .. { 1 Forester	15	
Fenny .. { 2 Watchers, at Rs. 6 each..	12	
1 Mohurrir	16	
Total ..	278	

Description.	Amount of Salary.	Remarks.
Dacca Division.	Rupees.	Area of division—
1 Writer	60	28,524 square miles.
1 Office peon	6	Forests not explored, but very extensive.
Forest Conservancy Establishment.		
1 Forest ranger, 2nd class	50	
1 Forester, 2nd class	14	
5 Watchers, at Rs. 7 each	35	
Total ..	165	
Bhaugulpore Division.		Area of division—
1 Writer	60	Bhaugulpore.. 16,917 square miles.
1 Office peon	6	Patna .. 24,387 „ „
1 Forest ranger, 2nd class	50	Chota Nagpore 36,000 „ „
1 Forester, 2nd class	14	Total .. 77,304 „ „
6 Watchers, at Rs. 7 each	42	
Total ..	172	
Upper Assam Division.		Area of whole of Assam—
1 Writer	80	30,000 square miles.
1 Office peon	7	
Forest Conservancy Establishment.		Area of forest, about—
1 Forest ranger, 2nd class	50	4,000 square miles.
2 Foresters, 2nd class, at Rs. 14 each ..	28	
8 Watchers, at Rs. 7 each	56	
Total ..	221	
Lower Assam Division.		
1 Writer	60	
1 Office peon	6	
1 Forest ranger, 2nd class	50	
2 Foresters, 2nd class, at Rs. 14 each ..	28	
7 Watchers, at Rs. 7 each	49	
Total ..	193	

APPENDIX C.

NOTE ON SILK MANUFACTURE IN ASSAM.

THERE are several kinds of indigenous silkworms in the province. Mr. T. Hugon, in a report submitted by Colonel Jenkins, a former commissioner of Assam, to the Agricultural Society, mentions the following:—The *eria*, *mooga*, *kontkuri*, *deo-mooga*, and the *hanu potonee*, besides the mulberry worm which is supposed to have been introduced by the Hindoos, who kept the silk of these worms for the use of their rajahs and great men. The Assamese will not make the silk from the mulberry worms, as touching them is considered degradation. A tribe called the Joogees alone attend to these worms.

The *deo-mooga* is said to have been introduced into Burmah by the Assamese taken into captivity after the conquest of Assam by the Burmese.

The kinds of silk mostly made and in use are—1, the *mezankoory;* 2, the *pât;* 3, the *mooga;* and 4, the *eria.*

The value of these kinds is at present given at the following rates per seer, viz.—*mezankoory*, Rs. 20 to 25; *pât*, Rs. 20; *mooga*, Rs. 3 to 8; *eria*, Rs. 2.

Mr. Hugon has mentioned the rates for *mooga*, in 1837, as having risen rapidly in three years from Rs. 3-8 to Rs. 5, and that it then sold at Gowalparra at Rs. 6-8 to Rs. 7, and at Dacca and Moorshedabad at Rs. 8. Nothing is mentioned regarding the price of the better kinds of silk; but it would appear from reports since written that the present value of the better kinds of silk has nearly doubled within the last few years.

Sufficiently precise information has not yet been obtained regarding the quantity of silk now made in Assam to justify any conclusion being come to as to the cause of this rise of price.

It was estimated in 1836 that about 1,000 maunds of silk were made in Assam, and that of this quantity some 300 maunds (representing a value, at Rs. 5 per seer, of Rs. 60,000) left the province, mostly for sale at Berhampore. Information as to present probable export has not yet been obtained, and it is not easy to get clear information on the subject. The civil officers of the district, who have now been called upon to report on the subject of silk manufacture, will no doubt be able to give valuable information for future guidance, which it is not possible at present to give here.

The shrubs and trees upon which the silkworms feed are very numerous. A list gathered from various sources is given below.

It would appear that the silk from worms fed on the *soom* tree (*Ricinus communis*) is the best, but it is said that the leaves of this tree are too hard for very young worms, which may be fed with advantage on the leaves of the *champa* until old enough freely to eat the *soom.*

Both these trees, as also the *addakoory* and others on which the silkworms feed, are found in tracts from which original forests have been cleared for cultivation.

The *soom* grows fast and attains a large size; but for silkworm-feeding young trees are used, as on them the worms are more easily managed, and the young leaves are in greater proportion. The *soom* is said to renew its leaves three times during the year. The patches of *soom* forest are scattered over the country, and cover an area generally of about half to three-fourths of an acre each. Their aggregate area at the present time is unknown, but it would seem that it is greater than is required for the present feeding of silkworms. Such tracts as are applied for to the civil authorities, are let at the rate of about Rs. 2 an acre for one year; and the revenue derived from the forests from this source alone is very considerable. It amounted to upwards of Rs. 24,000 in the district of Seebsaugor during the year 1868-69.

It is apparent, from the slight sketch given of the subject here, that there is a great deal of local and precise information yet to be obtained before a decision is come to as to what steps should be taken to stimulate the manufacture of silk. It is probable that the introduction of cheap cotton goods among the people has in great measure weaned them from the use of silk for their own use, and diverted their minds from its manufacture.

The tax levied on the feeding grounds may have something to do with checking increase, as also the difficulty of obtaining sufficient cocoons to breed from. It would seem that the chief market for purchase of these is at Gowhatty, in the Kamroop district, where no silk is made, but where the people resort for the purchase of cocoons, which are taken up-country in baskets, by boat or road, to be used in Upper Assam.

Inquiry into the subject will no doubt show that several means may jointly be adopted calculated to increase and stimulate silk manufacture in Assam. Inquiries of this kind, however, require time and much detailed local information, which can only be obtained by continued residence in the country.

It may be interesting here to give an extract from Mr. Hugon's report, showing the mode of rearing the silkworms and methods employed for their protection. The process described refers to the *era* and *mooga* worms, but will answer for all the kinds under slight modifications, with the exception of the imported mulberry worm, which is fed and reared entirely in the house.

Extract from Mr. Hugon's report.

To breed from, the Assamese select cocoons from those which have been begun in the largest number on the same day, generally the second or third day after cocoons have begun to be formed; those that contain males being distinguished by a more pointed end. These cocoons are put in a closed basket and hung up in the house, out of reach of rats and insects. When the moths come forth, they are allowed to move about in the baskets for twenty-four hours, after which the females (known only by the larger body) are tied to long reeds or canes, twenty or twenty-five to each, and these are hung up in the house. The eggs that have been laid the first three days, amounting to about two hundred, are alone kept; they are tied in a piece of cloth and suspended to the roof until a few begin to hatch. These eggs are white and the size of turnip seed. When a few of the worms are hatched, the cloths are put on small bamboo platters hung up in the house, in which they are fed with tender leaves. After the second moulting they are removed to bunches of leaves suspended above the ground; under them, upon the ground, a mat is laid to receive them when they fall; when they have ceased feeding they are thrown into baskets full of dry leaves, amongst which they form their cocoons, two or three being often found joined together.

* * * * * * * *

In four days the cocoons are complete. After the selection for the next breed is made, they are exposed to the sun for two or three days to destroy the vitality of the chrysalis. The hill tribes settled in the plains are very fond of eating the chrysalis; they perforate the cocoons the third day to get them; they do the same with the *mooga*, and sell few cocoons imperforated.

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The cocoons are put over a slow fire in a solution of potash, when the silk comes easily off; they are taken out and the water slightly pressed out; they are then taken one by one, loosened at one end, and the cocoon put over the thumb of the left hand, with the right they draw it out nearly the thickness of twine, reducing any inequality by rubbing it between the index and thumb: in this way new cocoons are joined on. The thread is allowed to accumulate in heaps of a quarter of a seer; it is afterwards exposed to the sun or near the fire to dry; it is then made into skeins with two sticks tied at one end and opening like a pair of compasses; it is then ready to be wove unless it has to be dyed.

The dyes used are lac, munjeet, and indigo.

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There are generally five breeds of *mooga* worms in the year; they are named after the months at which they generally occur:—

1. Jarooa, in January and February.
2. Jeytooa, in May and June.
3. Aharooa, in June and July.
4. Bhodia, in August and September.
5. Khotia, in October and November.

The worms thrive best in dry weather, but a very hot sunny day proves fatal to many at the time of moulting. At these periods rain is very favorable; thunder-storms do not injure them as they do the mulberry worm; continual heavy rains (which are rarer in Assam than in Bengal) are hurtful by throwing them down; showers, however heavy, cause no great damage, they taking shelter under the leaves with perfect safety. The worms during their moultings remain on the branches, but when about beginning to spin they come down the trunk, the plantain leaves preventing their going further down; they are collected in baskets, which are afterwards put under bunches of dry leaves suspended from the roof; they crawl up into these and form their cocoons, as with the *era* several are often joined together; the silk of these they spin instead of winding; above the plantain leaf a roll of grass is tied for those that come down during the night to begin spinning in: after four days the selection of cocoons for the next breed is made, and the rest wound off.

The total duration of a breed varies from sixty to seventy days. The period is thus divided :—

Four moultings with one day's illness attending each	20 days.
From fourth moulting to beginning of cocoon	10 „
In the cocoon	20 „
As a moth	6 „
Hatching of the eggs	10 „
Total ...	66 „

The exact quantity of silk which an acre of *mooga* trees can produce could not be ascertained without a trial. Fifty thousand cocoons per acre, which makes upwards of 12 seers, are considered by the Assamese a good yearly return. Sixty rupees the value of 12 seers must be a very profitable one, for there is little labor or expense to the ryot in making or keeping up a plantation; whilst the trees are young, the ground is available for cultivation besides rearing worms; sugar-cane, rice, pulse, &c., are cultivated with benefit rather than injury to the young trees. The tax is 14 annas the acre in this district. The great value of the *mooga* is that it enables the weaker members of a family to contribute as much as the most robust to the welfare of the whole. Besides attending to the worms, most of them weave, spin, or make baskets while watching them.

List of the cloths made in Assam of mooga and eria silks.

Name of Cloth.	Size in cubits.	Weight. Seer.	Weight. Chittack.	Price of thread.	Cost of weaving.	Total.	Remarks.
Mooga.				Rs. As. P.	Rs. As. P.	Rs. As. P.	
Soorias	7 by 1¼	...	6	1 14 0	0 3 0	2 1 0	Dhoties.
Ditto	16 by 2	1	...	5 0 0	0 8 0	5 8 0	Dhoties.
Mekla	5 by 1¾	...	4	1 4 0	0 2 0	1 6 0	Petticoats.
Rhia	12 by 1¼	...	8	2 8 0	0 4 0	2 12 0	Scarfs.
Gaursha	8 by 1	...	2	0 10 0	0 1 0	0 11 0	Worn as turbans or round the waist.
Goonta Bor Cappor	12 by 2½	1	...	2 0 0	0 6 0	2 6 0	Made of the floss and worn in winter.
Eria.							
Bor Cappor	16 by 3	1	8	3 0 0	0 8 0	3 8 0	Worn in winter, and used as a blanket; also made into coats.
Meklas	5 by 2	...	6	0 12 0	0 2 0	0 14 0	Used only by the poorer class.
Rhia	10 by 1¼	...	8	1 0 0	0 2 0	1 2 0	Used only by the poorer class.
Gaursha	8 by ¼	..	4	0 8 0	0 2 0	0 10 0	Used only by the poorer class.

List of shrubs and trees fed on by silkworms.

Local names.	Botanical names
By Eria Worms.	
1. Kossool.	Gmelina arborea.
2. Meekerdal.	
3. Hindoo Goch.	
4. Okonnee.	
5. Gomarree.	
6. Litta Pakoree.	
7. Borzonolly.	
By Mooga Worms.	
1. Addakoory.	Michelia sp.
2. Champa.	Michilus odorotissimus.
3. Soom.	Cylicodaphne nitida.
4. Kontooloa.	Letrenthera diglottica.
5. Diglutee.	Laurus obtusifolia.
6. Pattee Shoonda.	Tetrenthera machrophylla.
7. Souhalloo.	Zizyphus jujuba.
8. Ber.	Bombax hepta phillum.
9. ?	Jatropha curcas.
10. Castor-oil plant.	

Appendix D.

In 1283 tea was first heard of as indigenous in Assam; in 1824 leaves, seeds, and some hundred plants were sent to the Botanical Gardens, Calcutta. For some reason or other Dr. Wallich (I believe) pronounced them not to be "tea," and maintained this for some six or seven years.

In 1832 Lord Bentinck deputed Captain Jenkins to examine and report on this question, and aided by Lieutenant Charleton he settled it as true that tea was indigenous. Two years later, 1834, Government determined to introduce to this province the China variety of plants, which we may now deplore, as it bids fair to exterminate eventually the fine indigenous kind. In 1836 China plants arrived.

In the above we may notice that it took years of discussion ere it was conceded we had tea here at *all;* and that after all, the most inferior kind was largely introduced and propagated.

During the discussions that followed, as to the most suitable localities, it was constantly asserted that an elevation sufficient to ensure *frost* in winter was a necessary condition of success, and so deeply was this ingrained, that it lasts to our day. Hill land was sought for everywhere. Teelas planted where cultivation was out of the question, or the entire surface soil would wash off, and where difficulties of transport were at a maximum; all this too when it is patent that flat or slightly rolling land can be far better worked and cultivated, and now seen to pay equally well or better.

Tea may perhaps be traced to Kumaon from the fact that one of the Tea Commissioners was Dr. McCloll and, resident surgeon at that place.

Questions of soil and climate generally were attended to; but one branch of the latter subject almost entirely omitted, and which, except among planters, is even now almost ignored, *i.e.* the amount and *steadiness* of rainfall.

No matter how we may plant, prune, or cultivate, if we do not get rain the crop will fail. 1869 gave us some cases of this, and the spring of 1870 is a fresh case in point, where serious results followed the drought.

To most of us in Assam, this was an unusual affair, though not so to others. In the North-West and other places, where rain falls late, and more sparingly, the number of "flushes" of leaf are known to be far fewer than here, varying from 6 to 10 or 12 in some parts, and from 5 to 15 about Darjeeling even, while in Assam it is 20 to 22, which is most noteworthy.

We here get three flushes per month, while at Darjeeling and in the North-West they get often but one—see *Agricultural Gazette of India*, September 15th, 1870, &c.

Tracing the matter back, we find that at first there were said to be only four pluckings (or flushes) per season: the first in April, making Pekoe; second in June, making a coarser kind; third in August, making Souchong; and fourth in October, made Congou.

As time went on, the trees were pressed harder and yielded oftener, in some places now yielding eight pluckings, and where climate is most suitable up to twenty with profit.

It must be borne in mind that the *total* annual fall of rain will not indicate the most suitable area for tea growing. Many parts of India have a heavy annual fall down in a few months, and with long droughts before and after. What is needed is a steady monthly fall from, say, March till October, and it will be seen from *Sir Charles Lyell's Principles of Geology*, *Dr. Hooker's Himalayan Journal*, &c., that Eastern Bengal peculiarly fulfil these conditions.

The south-west monsoon passing over the Indian ocean and the Bay of Bengal becomes heated and charged to saturation with water, which it retains while traversing the lower tracts of land, until on the west side it impinges on Rajmehal, and on the eastern flank against the Khasi and Garo Hills, where, being deflected upwards into a colder strata, it precipitates water copiously.

Where no hills occur, as on the Calcutta line, this water-charged wind goes on till reaching Sikkim, where, meeting an obstacle and rising, it is cooled and discharges rain so freely that it makes Sikkim the "*wettest* part of the Himalayas."

It may be borne in mind that rainfall can be in excess, as at Cherra Poonjee, where the entire surface soil is so generally denuded.

In no other parts of the Peninsula of India can these conditions of steady average monthly rainfalls be found combined with suitable temperature and soil, and this leads me to consider Assam, Cachar, and lower ranges of Sikkim as really the only portions of this country *peculiarly* suited for "tea," as a staple.

In the North-West, in Bengal, and other places, tea will grow; but that it can be carried on *profitably* I very much doubt.

A collateral branch of this subject is the question of how far "forest" affects rainfall. Dr. Hooker says that the relative effects of rainfall on forest, and this again in return on the rainfall, are difficult to separate, as they act reciprocally, and undoubtedly *part* of our very "moist climate" is due to this cause; and how far it might be affected by extensive clearings is impossible to say with certainty.

It is usually regretted that with such fine soil and climate, Assam is such a huge "jungle," and that it is not opened up and cultivated extensively, while all the time it is possible that this *apparently* desirable object, if attained, might cause the ruin of the province for more than one reason; and that as these jungles disappear so may, to a great extent, the "fine growing climate," leaving us like lower Bengal.

This is a point on which all are more or less interested—Government, planters, and ryots. Last spring the latter suffered severely in many parts by the drought, as the land was too hard to plough till late in season. If it is once seen generally that North-East Bengal is *par excellence* the future "tea province," there will be as great a rush for land as of old for these forests, necessitating perhaps other *new rules*, unless the Government are prepared with sound arguments, demanding forest conservancy over and above those used by the Forest Department on account of timber. Grass land is here in abundance (fit to grow rice), there are many thousand acres of uncultivated "potar," as it is called; the native population could easily be quadrupled, adding to the prosperity of the valley, and grass jungle has little or no influence on rainfall.

There are reasons why the hills surrounding us need as yet no particular attention as to restriction in clearing forest, for as long as they are inhabited by the present races, "jooming" will be more or less a *necessity*, and thus some 90 per cent. of their area will be tree jungle. It is the attempt to render the plain of Assam a "fine open country" we must attend to. With regard to forest conservancy (as a principle), Assam is a most promising tract. It is especially suited for India rubber, of which there are several kinds (11 or 12 "bors" and some 40 ficus), Teak, Sâl, Sissoo, and many kinds of timber not yet known, and the preservation and propagation of which alone, to the exclusion of the host of useless timbers now on the list, would seem the soundest policy.

Large tracts on the banks of the tributary rivers, as near the hills as possible, could be reserved and laid out in forests. Of the various timbers worth growing, as yet little has been done of necessity. The forests generally, however, seem greatly overrated as to value of the standing timbers, and the attention of the department might profitably be directed more to the future than the present; and at same time that large future supplies of timber are secured, a general denudation be avoided. I may here remark that the really *workable* tea area in the province is far smaller than is generally supposed. To a casual traveller extensive tracts may be shown as tea land both in the plain and on the hills around, while to one in search for land it often turns out very limited. Patches of forest may be seen which on close scrutiny will yield but one or two per cent. of land safely above flooding level. In the hills, thousands of acres can be seen, out of a tenth of which alone could a "crop" be *transported*, and if steep, *cultivation* is impossible anywhere.

As regards irrigation, to which some writers point for the cure of drought, it is doubtful, first, if it can be done; secondly, if done, whether it would be effectual. A writer in the *Englishman*, October 12th, 1870, says—"Four or five men could irrigate eight acres per day." Let us compare this with ordinary rainfall. We here get about 25 of an inch per day, which on a garden of 200 acres equal some 5,000 tons of water. I doubt very much our ability either to lay this amount on or in teela gardens to find it *at all* during droughts; yet if all this could be laid on while the air passing over the garden was hot and dry, not a quarter would remain, but be evaporated in an hour. A *warm moist* air is what we need to force on the young shoots into leaves quickly (see *Lindley*), the air to be near the point of saturation so as to check evaporation, while the heat forces the growth, so that I doubt the advantage of irrigation with a dry air and hot sun shining, as is usual in droughts.

In conclusion, looking at the steadily increasing demand for Indian teas, the likelihood of recurring disturbances in China, and that tea when carefully grown (at the right localities) will yield large profits, it is no wonder we see the attempts made to introduce it as a staple all over India; but when carefully investigated, I believe it will be found that England's future tea garden will be Assam, and that wherever the climate is not both warm *and moist* from early spring to late autumn, tea, though it may grow, cannot be made to do so *profitably*.

APPENDIX E.

NOTE ON WORKING GOVERNMENT FORESTS.

PERMIT-HOLDERS *versus* GOVERNMENT AGENCY.

AT paragraph 9 of review of the annual forest report of the Lower Provinces of Bengal for 1869-70 the Government of India remark as follows:—

"But great care must be taken that if permits are issued, they are granted for short periods only to responsible parties, and that no prescriptive rights in working the forests are allowed to spring up, while due control is exercised by the forest department over the trees that are felled; and again (paragraph 30), it is a cardinal rule for forest management everywhere, that the actual felling of the trees should rest with the parties who have control of the forests, and it would appear on general principles desirable that no trees should be felled except by the direct agency of the forest department, after which they might be sold to contractors," &c.

2. His Grace the Duke of Argyll, Her Majesty's Secretary of State for India, in a review of the same report, remarks at paragraph 8 as regards the observations of the Government of India:—

"Mr. Leeds is strongly in favor of the permit system; and it has the advantage, with a small executive staff, of requiring less superintendence: but he passes over the consideration that the permit-holder may be a man of substance and may employ a large number of men, and that his object is present gain, while the object of the Government is the conservation of the timber for the future as well as for present use; with him therefore, as with other private individuals whom it is necessary to employ, a check is necessary; and the rule laid down by you, that no trees should be felled except by the direct agency of the forest department, ought to be adhered to."

3. The Government of Bengal, with reference to the order of the Secretary of State as given above, having requested an expression of my views on this subject, the following remarks are submitted, as an appendix to the annual report for 1870-71.

4. There is no doubt that the abstract rule as given by the Government of India, "that the felling of trees in a forest should rest with the parties who have control of the forests," is theoretically correct; but carrying it out, except under modifications to suit all the varying circumstances and requirements of time and place, is so far practically impossible, that if it were to be rigidly acted upon, in many places the resources of forests would remain untouched and perish where they grow, or timber would be felled which would never be removed.

5. As regards destruction done to forests under work in most parts of India, (park-like, pure, circumscribed forests, such as are met with in Oude, being excepted,) this is pretty much the same whether a Government agency or a permit system be employed. Timber cannot be extracted from the vast and scattered forests in India, which contain timber of all ages and kinds, without injuring some saplings of valuable kinds; and the coolies employed under contractors by Government agency, *i.e.* by the forest department, to extract timber, do as much injury as those of a permit-holder. Precautions are taken by means of penalty clauses in contracts as well as agreements with permit-holders to reduce this injury to a minimum, and on the whole it may, I think, be said that not much injury of a serious kind takes place.

6. The real question of preservation and supplies in natural forests lies in the measures taken to prevent the felling of under-sized and growing timber.

There are other little matters connected with the subject, but they need not be mentioned here.

7. I would remark that I am under the impression that future supplies, *i.e.* for a century hence, should be provided for by an extensive system of plantations of the best and most useful kinds of woods, so situated that the cost of removing timber will be small as compared with that from distant and almost inaccessible forests scattered over enormous tracts of country, and from which the supplies would be regular; while a general protection of the remaining forests in the country should be maintained, not only to economize resources while plantation timber is growing for local use, but in order to secure a certain area of forest covered land in the country, without which, as has been proved in many parts of Europe, certain unfavorable results occur.

To attempt a minute protection of the forests we possess here, for instance, would be to attempt that which could only be done at an enormous cost, if it at all, and render any profitable working of the forests impossible. Under permit-holders, if they can be got, the stocks of timber which have been growing for ages may possibly be got out with some profit to those concerned, but not in any other way I fear.

8. When a forest is worked under Government agency, it is intended that the trees should be selected and marked, killed and felled by the forest department officers.

But the number of officers granted by Government for the purpose is far too few to enable them personally to superintend all this work, and thus selection of the trees, in great measure, devolves upon a native forester, or the contractor who is to work out the timber, and who in his turn delegates part of the work to a coolie mistry. It may here be asked, after the timber has been marked and felled, how is it to be disposed of. No one would buy it without inspecting it. This cannot easily be done in the forests where the timber is lying scattered about, so that felling will in most cases also compel dragging and removal to depôts by the forest department.

9 I need scarcely go into details to show that this practically has little advantage over selection made by a permit-holder's people; indeed, I believe the permit-holder who is under heavy penalties, which can be recovered from him, is more careful to choose only the trees he intends to fell and take away, than the Government employés are to select for Government.

10. Of course it will be remarked that this should not be allowed; but those who have toiled all day hunting for trees fit for marking and felling up and down steep and hot mountains and into ravines, know how impossible it is to do more than a portion of the work that ought to be done, and for which there is only a limited short season.

11. Even though this work had been entirely done under the eyes of a European officer, what security is there afterwards that this timber only will be felled? There is not, and there cannot be, a sufficient Government establishment to be present with all the working parties in a forest, unless operations are very limited, and the forests compact and pure. Government agency in this work, so far as protection goes, is little more than a name as distinct from permit agency.

12. The permit-holder is free to employ a more efficient staff for doing his work. So long as he brings out the mature timber only which is in the forests,* he will, as a rule, do no harm to the forests; and in him, a man of substance, working on his own resources, and with his own capital, the forest department have good security against breach of clauses of agreement. Inspection of the forests he works is more complete, so as to detect any breach of agreement, and when discovered he must pay, running the risk also of finding his permit cancelled; but in the case of a contractor who is generally needy, and works on advances, Government have no hold over him, and small power of fining him for breaches of contract. Government is in fact in the contractor's hands, whereas a permit-holder is in the hands of Government.

* He can be restricted as to quantity, if necessary.

Mistakes, or breaches of rules, committed by Government subordinates lie hidden, while those of a permit-holder are brought to light and noised abroad.

13. These remarks tend to show that the forests are not practically, in my opinion, one bit safer under Government agency than under a permit system; while the latter has many advantages, in that "advances" (that destroyer of all peace to those concerned in giving contracts in this country) are entirely avoided, and the timber extracted is sold and paid for without any risk of loss.

14. It may be that the price received is not always so high as that which might be obtained at a good market, but these can be assimilated to market prices; and generally, if all things be considered, it is an advantage to sell timber as near the forests as possible, and thus avoid outstanding advances for dragging, carting, floating, hauling, and also the loss of timber in transit, and save all possible account and office work.

15. Another point has to be considered, where markets, as in the Lower Provinces, are few and bad, owing to the supplies which come to Calcutta by sea. Were Government to work the timber in the distant parts of the forests (where only at present any timber remains) under direct Government agency, they would have no certainty about the sale of their timber. If taken to market and sold at an open auction, heavy loss would very possibly be the result; whereas if a class of permit-holders who know all the intricacies of the local timber markets and prices can be created and got to work, they for the most part will have already "placed" the timber they are to work out at a price which will ensure them a certain profit of a few annas per cubic foot.

16. This to Government is impossible, and how impossible is shown by this, that even in the matter of sleepers,—the demands for which are regular, and the expenditure on which is a matter of considerable importance to Government where there is a 5 per cent. guarantee,—although I have sold a very large quantity of sleepers at different times, I do not remember selling a single one direct to a railway company.

17. All conservators of forests are responsible for the protection of the forests in their charge; they are also responsible to Government for making the best terms they can for the sale of all forest produce.

They may (or they are unfit for the appointment they hold) be trusted, under certain generally recognized principles, to make the best arrangements in order to secure both the above objects; and as what may answer in Burmah may be impossible in the Punjab, what will suit Oude will not suit the Lower Provinces of Bengal, these officers cannot be fixed down to any particular kind of action without reducing their efficiency.

18. Take, for example, the forests in Upper Assam. These virgin forests must and do contain vast quantities of mature timber, and also much that is far past age for use, and which is only preventing the growth of young valuable timber; but their supplies will never be brought to market with profit by Government agency, though gradually, if the way be shown by Government, it may be possible hereafter to get private enterprise to work them.

For this reason, I hope that the Government orders on the subject of direct Government agency in the matter of felling all trees will be so far modified, that while the principle is maintained as a "cardinal rule," conservators will be allowed to use their discretion as to the means to be employed, and that every possible facility will be given to private individuals who may be disposed to work forests and set up saw machinery; care being taken in the agreement to provide for protection of the forests, and that no prescriptive rights are allowed to spring up.

H. LEEDS,
Conservator of Forests, L. P.

The 3rd August 1871.

Form No. 21.

FOREST DEPARTMENT, BENGAL.

Annual Summary of Revenue and Expenditure in the different divisions during 1870-71.

Classification.	Direction.	Cooch Behar.	Upper Assam.	Lower Assam.	Chittagong.	Dacca.	Bhaugulpore.	Bhaugulpore sub-division.	Total.
Revenue.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
I.—Sale of timber at depôts	.....	53,297 13 6	.....	.....	.....	.....	.....	.....	53,297 13 6
II.— Ditto removed by purchaser	.....	3,768 7 6	.....	.....	.....	.....	.....	.....	3,768 7 6
III.—Duty on foreign timber	.....	.....	.....	.....	.....	.....	.....	.....	.....
IV.—Permit fees	.....	960 10 0	.....	.....	.....	.....	.....	.....	960 10 0
V.—Grazing dues and fisheries	.....	1,041 15 0	.....	.....	.....	.....	.....	.....	1,041 15 0
VI.—Sale of fruits, babool pods, &c.	.....	60 2 0	.....	.....	.....	.....	.....	.....	60 2 0
VII.— Ditto confiscated timber	.....	.....	.....	.....	.....	.....	.....	.....	.....
VIII.—Fines and forfeitures	.....	182 2 0	42 0 0	.....	.....	.....	.....	.....	224 2 0
IX.—Miscellaneous	.....	1,422 9 1	188 9 8	7 14 3	74 15 1	.....	40 10 5	55 10 0	1,790 4 6
Total ...	.....	60,733 11 1	230 9 8	7 14 3	74 15 1	.....	40 10 5	55 10 0	61,143 6 6
Expenditure.									
A.—Conservancy and working.									
I.—Timber expenses	.....	8,902 15 0	1,083 1 0	3 14 0	.....	.....	.....	.....	9,989 14 0
II.—Purchase of stock and cattle	.....	2,893 0 0	193 10 0	117 0 0	1,043 10 0	23 12 0	34 11 0	2,293 10 0	6,599 5 0
III.—Feed and keep of cattle	.....	1,073 0 0	984 12 0	131 11 0	.....	.....	216 9 0	163 8 0	2,569 8 0
IV.—Rent of leased forests	.....	.....	.....	.....	.....	.....	.....	.....	.....
V.—Charges in collecting revenue on grass	.....	55 5 0	.....	.....	.....	.....	.....	.....	55 5 0
VI.—Plantations	.....	1,575 9 0	94 12 0	.....	.....	.....	20 7 0	.....	1,690 12 0
VII.—Forest work	.....	100 0 0	38 12 0	.....	.....	.....	.....	.....	138 12 0
VIII.—Forest survey	.....	981 15 0	415 4 0	.....	.....	.....	73 9 0	45 6 0	1,516 2 0
IX.—Experiments on timber	.....	.....	29 8 0	.....	17 0 0	.....	.....	.....	46 8 0
X.—Communications and buildings	.....	1,449 15 0	24 12 0	.....	.....	.....	92 10 0	.....	1,567 5 0
Total conservancy and working ...	.....	17,031 11 0	2,864 7 0	252 9 0	1,060 10 0	23 12 0	437 14 0	2,502 8 0	24,173 7 0
B.—Establishments.									
I.—Salaries	17,610 4 5	11,252 12 0	8,448 1 0	1,889 7 0	2,702 15 0	1,203 7 0	1,439 0 0	2,920 8 0	47,466 6 5
II.—Allowances	2,451 11 9	3,037 15 0	1,190 6 0	386 0 0	782 12 0	347 2 0	330 0 0	717 10 0	9,243 8 9
III.—Contingencies	1,800 11 8	766 8 8	446 7 7	111 15 4	221 8 5	15 14 0	19 5 8	93 12 4	3,476 3 8
Total Establishments ...	21,862 11 10	15,057 3 8	10,084 14 7	2,387 6 4	3,707 3 5	1,566 7 0	1,788 5 8	3,731 14 4	60,186 2 10
Grand Total of Expenditure ...	21,862 11 10	32,088 14 8	12,949 5 7	2,639 15 4	4,767 13 5	1,590 3 0	2,226 3 8	6,234 6 4	84,359 9 10

Form No. 22.

FOREST DEPARTMENT, BENGAL.

Annual Abstract Account of the Cash transactions of the Forest Department, Bengal, during 1870-71.

Heads of Account.	Rs. As. P.	Rs. As. P.
To cash balance in hand on 1st April 1870—		
Sikkim	877 6 6	
Bhûtan	2 1 4	
Assam	471 0 11	
		1,350 8 9
„ Revenue received—		
Cooch Behar	60,733 11 1	
Upper Assam	230 9 8	
Lower Assam	7 14 3	
Chittagong	74 15 1	
Bhaugulpore	40 10 5	
Ditto sub-division	55 10 0	
		61,143 6 6
„ Remittances from public treasuries—		
Direction	21,862 11 10	
Cooch Behar	30,440 8 5	
Upper Assam	11,248 7 1	
Lower Assam	3,100 0 0	
Chittagong	5,042 3 0	
Dacca	1,616 14 0	
Bhaugulpore	2,655 0 0	
Ditto sub-division	5,652 8 2	
		81,618 4 6
„ Official postage		276 0 8
„ Mr. Mann's subscriptions to United Service Family Pension Fund		421 3 0
„ Amount payable in England by Mr. Read on account of salary overdrawn when on leave ...		800 0 0
„ Error in account—		
Upper Assam	0 1 0	
Lower Assam	0 0 6	
		0 1 6
„ Deposits—		
Cooch Behar	64 14 0	
Upper Assam	1,502 3 7	
Lower Assam	106 0 0	
		1,673 1 7
„ Advances recovered—		
Cooch Behar	11,680 8 9	
Upper Assam	2,608 15 10	
Lower Assam	690 0 0	
Chittagong	16 0 0	
Bhaugulpore	1,309 11 0	
Ditto sub-division	4 10 0	
		16,309 13 7
Total		1,63,592 8 1

Heads of Account.	Rs. As. P.	Rs. As. P.
By expenditure of the Department—		
Direction	21,862 11 10	
Cooch Behar	32,088 14 8	
Upper Assam	12,949 5 7	
Lower Assam...	2,639 15 4	
Chittagong	4,767 13 5	
Dacca	1,590 3 0	
Bhaugulpore	2,226 3 8	
Ditto sub-division ...	6,234 6 4	
		84,359 9 10
„ Remittances to State treasuries—		
Cooch Behar		60,315 2 7
„ Official postage		276 0 8
„ Re-payment of deposits—		
Cooch Behar	120 2 0	
Upper Assam	1,181 0 3	
		1,301 2 3
„ Advances made—		
Cooch Behar	10,824 13 1	
Upper Assam...	2,109 10 4	
Lower Assam	865 5 2	
Chittagong	16 0 0	
Dacca	16 5 0	
Bhaugulpore	1,309 11 0	
Ditto sub-division ...	131 6 6	
		15,273 3 1
" Error in account—		
Cooch Behar	0 2 0	
Upper Assam...	0 1 0	
Lower Assam	0 1 4	
Bhaugulpore sub-division ...	0 2 0	
		0 6 4
„ Cash balance in hand on 31st March 1871—		
Cooch Behar	449 15 9	
Upper Assam...	242 7 11	
Lower Assam	398 8 11	
Chittagong	349 4 8	
Dacca	10 6 0	
Bhaugulpore...	469 6 9	
Ditto sub-division ...	146 13 4	
		2,066 15 4
Total		1,63,592 8 1

Form No. 23.

FOREST DEPARTMENT, BENGAL.

Annual Statement of Outstandings and Liabilities of the Department on account of Contractor and Disbursers for 1870-71.

		Department Debtor.		Department Creditor.			Balance due.
		Recoveries in cash and value of supplies and work done during year.	At close of year.	At commencement of year.	Payments made during year.	At close of year.	To Department (outstandings).
		Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Carting timber ...	Cooch Behar ...	1,138 13 9	1,138 13 9	4,306 11 9	7,828 12 9	12,135 8 6	10,996 10 9
	Assam	.....	.....	.....	.....	.....	.....
Sawing timber ...	Cooch Behar ...	687 6 9	687 6 9	2,735 2 7	555 1 6	3,290 4 1	2,602 13 4
	Assam	.....	.....	.....	.....	.....	.....
Felling & floating	Cooch Behar ...	4,824 3 0	4,824 3 0	6,435 14 0	313 0 0	6,748 14 0	1,924 11 0
	Assam	1,172 15 0	1,172 15 0	.....	1,900 0 0	1,900 0 0	727 1 0
Plantations ...	Cooch Behar ...	.....	.....	.....	75 0 0	75 0 0	75 0 0
	Assam	.....	.....	.....	.....	.....	.....
Other works ...	Cooch Behar ...	1,171 9 3	1,171 9 3	281 8 3	922 1 0	1,203 9 3	32 0 0
	Assam	53 12 0	53 12 0	.....	96 5 4	96 5 4	42 9 4
Total ...		9,048 11 9	9,048 11 9	13,759 4 7	11,690 4 7	25,449 9 2	16,400 13 5

Form No. 24.

FOREST DEPARTMENT, BENGAL.

Statement of Timber brought to Depôts from the different Forest Divisions during 1870-71.

Name of river or division.	Forest.	Description of timber.	Pieces.	Cubic feet.	Total of each river. Pieces.	Total of each river. Cubic feet.
Sikkim Sub-division ..	Rayeng	Sâl sleepers	459	1,562		
	Sivok	Ditto	445	1,514		
	Sookna	Planks and scantlings	222	.....		
	Loharguric	Sâl sleepers	602	2,048		
	Siligoree	Sâl logs	7	161		
		Sâl sleepers	50	170	1,785	5,455
Bhutan Sub-division	Mooraghat	Sâl logs	10	380		
	Alipore	Karla Kumbers	43	.....		
		Planks and scantlings	47	.....		
	Santrabarry	Sâl sleepers	11	37		
		Planks and scantlings	205	.....		
	Buxa	Sâl logs	2,627	75,703		
		Planks and scantlings	106	.....		
	Doma	Sâl logs	90	2,610		
	Panbarry	Planks and scantlings	38	.....	3,177	78,730
		Total	.....	.....	4,962	84,185

Form No. 25.

FOREST DEPARTMENT, BENGAL.

Annual Timber Account for 1870-71.

Particulars.		Pieces.	Total.
I.—Stock in hand at the following depôts at the commencement of the year—			
1. At Station depôts—			
Logs	2,707		
Sleepers	21,244		
Planks and scantlings ...	10		
Saplings	486		
Shingles	88,000		
Karla Kumbers	851	1,13,388	
2. At Forest depôts—			
Logs	4,667		
Sleepers	23,464		
Planks and scantlings ...	241		
Karla Kumbers	370	28,742	1,42,130
II.—Timber received at depôts from the forests—			
1. At Station depôts—			
Logs	17		
Sleepers	50		
Planks and scantlings ...	47		
Karla Kumbers	43	157	
2. At Forest depôts—			
Logs	2,717		
Sleepers	1,517		
Planks and Scantlings ...	571	4,805	4,962
Total		.....	1,47,092

Particulars.		Pieces.	Total.
I.—Timber removed by purchasers from depôts—			
Logs	1,143		
Sleepers	17,434		
Saplings	306		
Planks and scantlings	13		
Karla Kumbers	478	19,374	
II.—Timber lost and used by the department—			
Logs	11		
Sleepers	4,338		
Saplings	180		
Shingles	88,000		
Planks and scantlings ...	243		
Karla Kumbers	182	92,954	1,12,328
III.—Stock in hand at close of the year—			
1. At Station depôts—			
Logs	1,026		
Sleepers	14,334		
Planks and scantlings ...	264		
Karla Kumbers	360	16,884	
2. At Forest depôts—			
Logs	7,118		
Sleepers	10,169		
Planks and scantlings ...	349		
Karla Kumbers	244	17,880	34,764
Total		.....	1,47,092

Form No. 26.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount realized on account of the different classes of timber sold during 1870-71.

Divisions.	Number of logs and pieces.	Average cubical contents per log.	Amount realized on account of timber sold.	Average amount per log.	Average amount per ton (50 cubic feet).
Cooch Behar Division.			Rs. As. P.	Rs. As. P.	Rs. As. P.
Sâl logs	1,125	28′ 0 0	12,665 11 7	11 4 1	20 1 8
Sissoo logs	18	9′ 0 0	18 0 0	1 0 0	5 8 10
Sâl sleepers	17,434	3′ 4″ 10‴	29,817 12 0	1 11 4	25 2 1
Planks and scantlings	13	.....	13 12 0	1 0 11	.. ..
Saplings	306	.....	7 0 0	0 0 4	.....
Karla Kumbers	478	.....	756 8 0	1 9 3	.
Total ...	19,374		43,278 11 7		
Deduct amount due but not realized during year			714 10 0		
		Balance ...	42,564 1 7		
Add amount realized on account of former years			368 8 5		
Total shown as revenue on account of timber sales			*42,932 10 0		

* Amount credited in annual summary of revenue is Rs. 53,297-13-6; but timber to the value of Rs. 10,365-3-6 has yet to be delivered.

Form No. 27.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount expended on account of timber received from the different Forest Divisions during 1870-71.

Name of Division.	Number of logs.	Cubical contents.	Timber expenses.	Average cubical contents per log.	Average paid per 50 cubic feet.	
Cooch Behar Division.			Rs. As. P.			
Logs	2,734	78,854	14,959 0 0	28′ 10″ 1‴	9 7 9	This timber was felled and partly dragged in former years. The amount shown is expenditure incurred in 1870-71.
Sleepers	1,567	5,331	1,794 4 0	3′ 4″ 10‴	16 13 3	
Planks and scantlings	618	.....	270 6 0			
Karla Kumbers	43	.....	8 1 0			
Total ...	4,962	84,185	17,031 11 0			

Form No. 28.

FOREST DEPARTMENT, BENGAL.

Annual Account of Forest Revenue for the year 1870-71.

	Rs.	As	P.
Receipts	61,143	6	6
Expenditure	84,359	9	10
Deficit	23,216	3	4
Add difference between assets and liabilities	13,820	5	0
Total deficit ...	37,036	8	4

NOTE.—The revenue collected on forest produce by civil officers in the Lower Provinces of Bengal amounted to Rs. 58,534-2-5. If the above deficit be deducted from this sum, a net revenue of Rs. 21,497-10-1 is the result.

Detail of difference between Assets and Liabilities at commencement and close of the year.

	At the commencement of the year.	At the close of the year.	Difference.	
			In favor of the year.	Against the year.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Value of timber	2,91,441 0 0	2,72,657 4 7	.....	18,783 11 5
Value of elephants and buffaloes	7,223 0 0	9,148 12 0	1,925 12 0	.....
Outstanding on account of sales...	318 8 5	714 10 0	396 1 7	.....
Excess payments, to contractors	13,759 4 7	16,400 13 5	2,641 8 10	.....
Total assets ...	3,12,741 13 0	2,98,921 8 0	4,963 6 5	18,783 11 5
Deduct difference ...	.....	.....	.....	4,963 6 5
Balance ...	.....	.....	.....	13,820 5 0

FOREST DEPARTMENT, BENGAL.

Statement of value of timber in hand on 31*st March* 1871.

Description of Timber.	Quantity.		Estimated selling rate per 1 cubic foot.	Estimated value.
	Number of logs and pieces.	Cubical contents.		
In Station Depôts.			Rs. As. P.	Rs. As. P.
Logs	1,926	75,114	1 8 0	1,12,671 0 0
Sleepers	14,334	48,775	2 6 0 each.	34,043 4 0
Planks and scantlings	264	.....	0 12 0 each.	198 0 0
Karla Kumbers	360	.....	0 4 0 each.	90 0 0
Forest Depôts.				
Logs	7,118	220,658	0 8 0	1,10,329 0 0
Sleepers	10,169	34,602	0 7 0	15,251 14 7
Planks and scantlings	349	.....	0 2 0 each.	43 10 0
Karla Kumbers	244	.....	0 2 0 each.	30 8 0
Total ...	34,764	3,79,149	.....	2,72,657 4 7

H. LEEDS,

Conservator of Forests, L. P., Bengal.

BENGAL SECRETARIAT LIBRARY.

(RESOLUTION.)

REVENUE DEPARTMENT.

FORESTS.

Fort William, the 26th September 1871.

READ—

The progress report of forest administration in Bengal for the year 1870-71.

RESOLUTION.—This report has, in accordance with standing orders, been drawn up under the heads of—

I.—Inspection of forests.
II.—Forest reserves.
III.—Plantations.
IV.—Yield of forests.
V.—Financial results of the year's work.
VI.—General.

2. (PARAS. 11—20.) Forest explorations were effected during the year under report in Behar, in Chota Nagpore, in Chittagong, and in a part of Cooch Behar. In the Hazareebaugh district, and over the greater part of the Chota Nagpore country, almost all the forests belong to the Ramgurh Rajah and to other landholders. The forest bill now before the Legislature will enable the Government to introduce some kind of conservancy into private forests, if the wants of the public require such a measure; but for some years to come the Bengal Forest Department will probably have quite enough to do in managing Government forests. The patches of young sâl timber in the Palamow sub-division, which were inspected during the year, can best be looked after by the local civil officers with the help of a small staff of watchers from the Forest Department.

3. (PARAS. 21—22.) There can be no doubt but that, as the Conservator says, the tribes which practise *joom* cultivation do harm to the forests. But it will not be possible or expedient to attempt to stop the practice of *joom* altogether. All we can at present do is to keep fresh *joomeahs* from entering tracts which may hereafter be forest reserves. The hill tribes have cultivated with the axe for many generations; they cannot suddenly take to the plough; and after all, so long as they are kept out of the best timber forests, and so long as they do not shave the tops of the hills or the banks of nullahs, these *joomeahs* do much useful pioneering. The civil officers, aided by the force of events, may in course of years gradually bring these jooming tribes to adopt settled cultivation. But any attempt suddenly to stop jooming on the hill sides of our eastern and western frontiers must drive these people either to migrate into adjoining chiefships, or to starvation, or to living by plunder.

4. The Lieutenant-Governor concurs in the Conservator's view as to the injury which may be done to the water-supply by cutting all trees on the banks of nullahs or hill streams. The forest rules of some provinces forbid the felling of trees in Government forests within a specified distance of the bank of a nullah; and His Honor will be ready to consider any suggestion for embodying some such prohibition in the Bengal forest rules

5. (Paras. 30—32.) If the sâl forests belonging to the banished Arjoon Sing of Porahat contain really good timber, and are accessible by the Koel river, the divisional forest officer should arrange some plan of conserving these forests with the Deputy Commissioner, who is now managing the estate.

6. (Paras. 33—41.) The sâl forest of Sarunda appears to be the only good Government forest in the Chota Nagpore and Cuttack country. Its immunity from *joomeahs*, and its accessibility by water, make it particularly favorable for conservancy operations. The value of its timber will be largely increased if water communication should be established between the forest and the Damoodah; but the cost of rafting successfully a heavy timber like sâl down a long river system will be considerable. Until the Sarunda forest can be demarcated, it should, as suggested by the Conservator, be managed by the district officer.

7. (Paras. 43—49.) Captain Losach's inspections seem to make it clear that there is no timber forest left on the northern face of the Kymore range towards the Shahabad side. It is not stated whether the forests which are said to have formerly existed on that tract were on Government lands or as private properties; but the Lieutenant-Governor observes that they are shown as private forests in Lieutenant Stenhouse's map of 1868-69.

8. (Paras. 50—59). The special report on the forests of the Damin-i-koh has been fully considered by the local civil officers, by the Conservator, and by the Government. There are doubtless some seventy square miles of fair sâl forest in the Godda and Doomka Damins; but the forest is mixed up with the cultivated lands of the Sonthals and of the hill men. It will be quite impossible to make reserves in the Damin until the rights of both these races over the forest shall have been inquired into and adjusted. At the present time it is particularly inexpedient to harass the Sonthals with strict forest rules. The civil officers will do what may be fit towards checking the indiscriminate felling or destruction of young sâl trees; and their knowledge of, and influence with the people will enable them to manage some kind of conservancy in the better sâl forests; but for the present the Lieutenant-Governor has decided not to introduce the Forest Act or forest rules into the Damin-i-koh.

9. (Paras. 60—64.) The Cooch Behar forests had been inspected in previous years, and the explorations of the past year do not seem to have added to our knowledge regarding these forests.

10. (Paras. 65—77.) The attempt to explore the extreme Government forests in the Chittagong Hill Tracts was unsuccessful owing to the want of elephants and the absence of a sufficient police guard. In another year such wants should be foreseen and provided for before explorations of this kind are undertaken. The small tract which Mr. Davis, Assistant Conservator, was able to explore appears now to contain but little large timber of best kinds. The timber collections* on the Kurnafoolie and its tributaries during a part of April last make it quite clear that there is still a great deal of fine timber at accessible places in the drainage basin of the Kurnafoolie.

11. The report now under review does not refer to explorations and inspections effected in previous years. But from the forest map which accompanied Lieutenant Stenhouse's report for 1868-69, and from previous reports,

* At the rate of above Rs. 2,500 a week.

the Lieutenant-Governor gathers that the Government forests of the Dacca and Chittagong divisions have still to be explored; while the private forests in Mymensing, in some of the tributary mehals, and in Chumparun, have not yet been examined by the Forest Department. The Assam forests, lying at the foot of the Himalaya and in the valleys immediately under the Patkoi range, have not yet been fully reported upon.

12. (PARAS. 78—88.) The forests which have been declared "reserves" in Bengal up to date appear to be—

the Sikkim temperate forests	...	about	17	square miles.
„ „ terai „	...	„	42	„ „
„ Bhútan Dooars „	...	„	740*	„ „
„ Nambur forests and the forests on the Dhunsiri	...	„	750	„ „

13. Proposals to select "reserves" in the Chittagong Hill Tracts, in the Kamroop, Lukhimpore, Nowgong, and Naga hills districts, are under discussion with the local officers, and in none of these districts can such measures be adopted without their full concurrence. Complications with the wild or border tribes would inevitably result from any rash actions.

14. The work of the Forest Department in its reserves during the year appears to have been small. Scarcely anything appears to have been done towards dividing off the reserves in blocks, making valuation surveys, or laying down a system for conserving or working these reserves. Paragraph 17 of the report for the year 1869-70, discussed the necessity for carrying out such operations, and their advisability was declared in paragraph 19 of Government resolution reviewing the report. The whole work has still to be done, for the inspection of a small patch of jungle like the Dulka jhar, with an area of six square miles, cannot really count for anything.

15. (PARA. 80.)—The Lieutenant-Governor is not prepared to accept as conclusive the general remark that "very little permanent demarcation of boundaries" of reserves will be necessary. He apprehends much risk of future trouble if forest reserves are not demarcated, and he desires that this requirement may always be kept in view when reserves are taken over by the Forest Department.

16. (PARAS. 90—91.) The Lieutenant-Governor is clearly against the Forest Department taking over larger reserves than it can manage or utilize; and he considers that it quite right to withdraw from forest jurisdiction the Sikkim tracts, which have no timber and are in no way fitted for reserves.

17. (PARAS 92—105.) The plantation of temperate forest trees in Sikkim appears to be doing fairly well; but it appears to the Lieutenant-Governor that plantations of oak, chesnut, and walnut, hardly afford a sufficient experiment. Oak has never been a useful timber in India, and the chesnut is not ordinarily a timber tree. He thinks, that the various pines should be tried. It is hard to believe that none of them will flourish in this part of the Himalaya, seeing how immense is the variety now known. The Wellingtonia Gigantica should also be tried. The Lieutenant-Governor would have been glad to know what this and other plantations cost yearly, and what their eventual cost is likely to be before their timber comes to market. It seems unwise to multiply plantations in remote spots, where even the natural-grown timber is with difficulty brought to market. Successful

* It does not appear on what calculation the area of the proposed Bhútan reserves is put down at 3,398 square miles in paragraph 79 of the present report, for according to the table in last year's report the total area of "forest lands" in the Eastern and Western Dooars is put down at 670,000 acres.

plantations will be most valuable in well-peopled tracts, or close to navigable rivers on which timber can be rafted to the best markets. The Lieutenant-Governor will be ready to support any well-considered proposal for establishing plantations near Sherghotty or opposite Rhotasgurh. But plantations in the plains will, it is feared, not pay unless they are on Government land or on land which has been bought very cheap, and unless there are facilities for cheap and complete irrigation. The forest officers should, in concert with the Canal Department, arrange for planting timber or other trees along the bank and spoil of the Soane canal, now in course of construction.

18. (Paras. 106—117.) So far as the Lieutenant-Governor understands the matter, he would not be prepared to receive favorably any proposal for bringing a road steamer or a steam plough on to the Government plantations in Bengal. Even if the ground were suited for such machines, the Forest Department is hardly ready for them. As yet we know little about the best sites for plantations, about the best way of managing them, or about the best trees to propagate in the different parts of the province.

From paragraph 115 it is not clear whether the estimated cost (Rs. 30 an acre) for a teak plantation includes the total cost of the plantation until the trees reach maturity, or whether each acre of teak plantation will cost Rs. 30 a year; and if so, then for how many years will this outlay be required? The Lieutenant-Governor would be glad that next year's report should give more detailed information regarding the cost and the method of managing existing plantations in the hills, in the terai, and in the open country.

19. (Paras. 118—131.) The only timber felling operations of the year were undertaken in the forests of the Dehing and the Debro and in the Nambur forests. Five hundred and ten trees were felled and cut into 1,086 logs, which were dragged outside the forests to depôts on the river banks. The cost of felling and bringing to depôts was at first about four annas a cubic foot, but the Conservator hopes to bring it down to one and a half or two annas. The actual cost of these experimental operations, the cost of and loss in rafting, and the yield of the timber when sold, should be specially noted in next year's report. It can hardly, however, be expected that the results will be so favorable as careful working on a large scale might hereafter become. These operations were, it appears, undertaken without sanction; and the Lieutenant-Governor desires that for the future no fresh timber felling work on a large scale be begun without previous sanction to a well considered plan.

20. (Paras. 121—126.) The Lieutenant-Governor is glad to learn that the Forest Department turned its attention successfully to bringing out of the Bhútan forests the timber cut in previous years, and that no fresh felling took place. The sâl timber sold at the Bhútan depôts appears to have fetched between six or seven annas a cubic foot all round, while the timber brought from the forest to the depôts cost three annas a cubic foot during the past year, besides what it may have cost in previous years for felling and establishment; it is not therefore possible to say whether the Government lost or gained on the timber sold at seven annas a foot. It is observed that the report does not mention what was done during the year in the reserves near Darjeeling.

21. (Paras. 132—138.) The balance sheet of the department's operations for the year is, as the Conservator remarks, unfavorable; for the expenditure was Rs. 84,459, while the income was Rs. 61,143. But so long as the Forest Department is occupied with the very necessary work of exploring forests, selecting reserves, demarcating reserves, and bringing them into

order; and so long as there is but little timber felling done, the receipts proper of the Forest Department cannot be expected to equal the outgoings. If there were a good year's work to show for the money, the Lieutenant-Governor would not grudge a small deficit in the Forest Department during the first few years of its existence. The crediting of the tolls on Chittagong rivers to forest revenue may next year bring the Forest Department receipts up to its expenditure, although that cannot be considered to be an income due to the establishment of a Forest Department.

22. The report does not state how much miscellaneous forest revenue was collected by local officers in each district, nor does it state what forest districts have failed to show any forest revenue: the total forest revenue realized by district officers is stated by the Conservator to have been Rs. 53,534. It appears from correspondence in this office that district officers realize some miscellaneous revenue from forests in the districts marginally noted. The Board of Revenue will be asked to direct the officers of forest districts to send to the Conservator quarterly statements of the forest collections during the three months next preceding.

Kamroop.	24-Pergunnahs.
Durrung.	Backergunj.
Luckimpore	Cachar.
Seebsaugor.	Gowalparrah.
Nowgong.	Julpigoree.
Naga Hills.	Sonthal Pergunnahs.

23. Having now reviewed such paragraphs of the report as refer to the operations of the year 1870-71, the Lieutenant-Governor is obliged to say that, so far as he can see, the cause of forest conservancy in Bengal has not made much progress during the year. Little has been done towards bringing the reserves into working order. Save in the Bhaugulpore forest division, there has been very little exploration. Timber operations had (very properly) been confined within very small limits; and none of the reserves in Assam, except the Nambur and Dhunsiri forests, have been finally set apart for conservancy. The ill health of some officers, and the incompetency of others, on the forest staff doubtless account for much shortcoming. Now that two Deputy Conservators have been sanctioned for Bengal, the Lieutenant-Governor would hope that the business of the Forest Department may go on systematically and effectively.

24. The Lieutenant-Governor is satisfied that, for the present at any rate, the collection of forest revenue from petty products, such as grass, lac, rubber, silk cocoons, bamboos, should be managed everywhere, save in reserves, by the district officers. The forest officers may be able, when they shall have got their own proper work thoroughly in hand, to help the revenue officers by inspecting open Government forests, and by lending to the revenue officers men with some knowledge of jungle work.

25. The Conservator's remarks, appended to the present report, regarding the advisability of granting permits to fell timber to private persons, have been considered by the Lieutenant-Governor. In the Chittagong Government forests a practice much akin to the system of granting permits prevails. The headmen of timber gangs are allowed to go into the forests and cut what they like, so long as they bring away no timber under a certain girth, and so long as they pay timber tolls on the rivers. The headmen are prohibited from felling trees below a certain girth; but for the present at any rate the only real check upon them is that imposed at the toll collecting stations. The Lieutenant-Governor would not approve the extension of the Chittagong system into any reserves, or indeed into any forests which could be looked after. But he would be quite willing that the Conservator should grant permits, at rates to be fixed hereafter, for a certain number

of trees to be cut within a specified area and removed from the forest within a specified time. The permit would define accurately the minimum girth at which each kind of timber could be cut, and it would lay down penalties for breach of its terms. If this system were worked and watched for two or three years, the Forest Department would be able to tell whether it was possible really to enforce the conditions of such permits. It would obviously be preferable that no tree should be cut in a valuable forest until it had been marked for felling by a skilled forester; but as matters stand in Assam, where there is an active local demand for timber, and where the forest establishments are unable to undertake the work of felling themselves, it is clearly necessary to adopt a system which will supply the demand and also bring in some revenue; such a system of permits ought both to protect growing trees from being felled, and ought also to prevent contractors from felling trees which they cannot or will not take away. Such permits should be granted by forest officers for reserves, and by the local revenue officers for all other Government forests. The Lieutenant-Governor would be glad to receive an expression of the Conservator's views as to the rates and conditions on which such permits might be granted.

26. It is quite possible that careful administration may considerably increase these miscellaneous revenues in some of the forest districts; but it must be borne in mind that our best forests are inhabited by more or less wild tribes, who resent interference, who are unaccustomed to control, and whose resentment finds expression in raiding, robbing, and murdering. It is of course impossible for the British Government to acquiesce in the border tribes raiding on its peaceable subjects; and at the same time it costs some lives and much money either to repress or to punish such outbreaks. The Lieutenant-Governor would prefer to leave much miscellaneous forest revenue uncollected rather than stir up the excitable forest tribes. If we can conserve sufficient selected forests in accessible places; if we can check the unrestricted cutting of unmatured timber trees; and if we can raise a moderate forest revenue from such miscellaneous forest produce as may be yielded by Government forests,* and may be consumed in the open country, we can afford to abstain from measures which are certain to arouse the fears and evoke the prejudices of wild hill tribes.

27. The suplementary report regarding silk-worm culture and silk trade in Assam reached the Lieutenant-Governor after he had considered the rest of the report. The information therein furnished is incomplete; and His Honor must await the Commissioner's report before he can pass any orders on the matter.

28. The Lieutenant-Governor does not clearly understand the present arrangements for protecting and realizing a revenue from india-rubber trees in Cachar and in some districts of Assam. A long correspondence does not seem to have led to any very satisfactory result, and things are apparently very much as they were in Assam. From papers which have come before him, it would seem that the india-rubber trade of Cachar, which used to be considerable, had been in some way stopped. He would wish to know in what districts, and under what restrictions, lac is collected, and where the stick-lac so collected is taken for sale or for manufacture. So far as the Lieutenant-Governor knows the lac trade of the jungles in the upper basins of the Godavery and Mahanuddy rivers in Central India,

* A plan for raising a considerable revenue from the Soonderbun forests has been submitted by the Commissioner of the Presidency division, and is now under the Lieutenant-Governor's consideration.

the lac insect (coccus lacca) propagates itself sufficiently fast in jungles which are suited to its growth; and he would not anticipate much result from attempts to distribute lac insects artificially in the manner suggested at paragraph 129 of the report. There is no reference in the report to any trade in forest resins and gums, beyond the mention (at paragraph 40) of the injury done by tapping trees for resin in the sâl forests of Sarunda. The Lieutenant-Governor would be glad to receive from the Conservator, before the cold season begins, a report showing the different Government forests which produce rubber, lac, and other resins, stating how these products are now gathered and brought to market, whether any revenue is paid upon them, and suggesting how the revenue can be best collected, and rubber trees can be best protected by the district officers.

29. The Lieutenant-Governor would wish that next year's report should show what may have been done in each forest division under every head of forest business; and he would wish that the names of the officers who are in charge of each division should be given. Application was made during the year which has just passed for considerable increases to the pay of the forest officers, but the Lieutenant-Governor was unable fully to support such application. Now that two Deputy Conservators are sanctioned for Bengal, it is expected that the forest establishments will be more efficiently organized, and more effectively managed, than seems to have been the case during the year under review.

By order of the Lieutenant-Governor of Bengal.

C. BERNARD,

Offg. Secretary to the Govt. of Bengal.

No. 3628.

COPY forwarded to the Conservator of Forests, whose attention is specially drawn to paragraphs 27 and 28.

No. 3629.

COPY forwarded to the Board of Revenue, whose attention is drawn to paragraph 28.

Circular No. 38.

COPY forwarded to the Commissioners of Forest Divisions, namely, Assam, Dacca, Chittagong, Chota Nagpore, and Cooch Behar.

No. 3630.

COPY of this Resolution and of the Forest Report, with 320 spare copies of each, submitted to the Government of India, Agricultural Department, with reference to circular No. 6, dated 21st April last, from the Public Works Department.

By order of the Lieutenant-Governor of Bengal.

R. H. WILSON,

Offg. Under-Secy. to the Govt. of Bengal.

FORT WILLIAM :
The 26th September 1871.

PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN THE

LOWER PROVINCES OF BENGAL

FOR THE YEAR ENDING 1ST APRIL

1872.

BY

H. LEEDS, Esq.,

Conservator of Forests, Bengal.

Calcutta:

PRINTED AT THE BENGAL SECRETARIAT PRESS.

1872.

PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN THE

LOWER PROVINCES OF BENGAL,

FOR THE

Year ending 1st April 1872.

By H. LEEDS, Esq.,

CONSERVATOR OF FORESTS, BENGAL.

No. 22, dated the 19th July 1872.

From—H. Leeds, Esq., *Conservator of Forests, Bengal.*

To—*The Secretary to the Government of Bengal, Revenue Department.*

I have the honor to forward the Annual Forest Report for the year ending 31st March 1872.

INTRODUCTORY.

List of officers and divisions.

1. The following is a list of the forest officers and the divisions they have in their charge :—

Mr. C. H. James, Sub-Assistant Conservator of Forests, Cooch Behar division.

,, Elton Forrest, Assistant Conservator of Forests, Assam division.

,, A. P. Aylmer, Assistant Conservator of Forests, in charge of Kamroop Forest Surveys, Assam (on special duty).

,, W. Shakespear, Assistant Conservator of Forests, Dacca division.

,, H. H. Davis, Assistant Conservator of Forests, Chittagong division.

Captain C. W. Losack, Officiating Deputy Conservator of Forests, Bhaugulpore division.

Deputy Conservator gazetted to join Lower Provinces, but not arrived.

2. In October last a Deputy Conservator was gazetted to come to Bengal, and it was proposed that he should take charge of the two local divisions in Assam with an assistant under him. As he was daily expected, the opportunity of amalgamating the two offices of the Upper and Lower Assam divisions which presented itself on the arrival of Mr. Forrest in June 1871, was taken advantage of, there being no forest officer at the time in Assam owing to Mr. Mann of the Upper division being away on sick leave, and the officer formerly in charge of the Lower division having been dismissed.

Amalgamation of the Upper and Lower Assam divisions.

3. The two offices were accordingly amalgamated pending the arrival of the Deputy Conservator, and have been in charge of Mr. Forrest ever since; for although the expected Deputy Conservator wrote in November, saying that he was under immediate orders to join, he has not been heard of since.

4. Mr. Aylmer is on special duty in Kamroop at present. He has not been posted to any particular division.

5. These changes in the establishment, which arise from unavoidable causes, added to the intervals during which there are no officers in charge and new officers are becoming acquainted with their divisions, materially affect the progress of all work. This is especially the case in a vast country like Assam, where local knowledge is not quickly obtainable and travelling by no means easy.

Disadvantages of changes in establishment and delays in joining.

6. In Dacca division there was no officer until October 1871, when Mr. Shakespear joined.

7. List of appendices attached to report :—

A.—List of private forests in Bhaugulpore, areas, &c.

B.—Return regarding stick-lac in Bhaugulpore, Sonthal Pergunnahs, Patna, Chota Nagpore.

C.—Extract from report, Dacca division.

D.—Report on Brahmini river as connected with the floating timber.

E.—Extract from Cooch Behar report giving description of each Government Forest tract and reserves.

F.—Note on forests in the United States.

G.—Import of timber by sea to Calcutta.

List of Statements.

Form 21.—Annual summary of revenue and expenditure.

,, 22.—Ditto abstract account of cash transactions.

,, 23.—Ditto statement of outstandings and liabilities.

,, 24.—Statement of timber brought to depôts.

,, 25.—Annual timber account.

,, 26.—Ditto statement showing amount realized on different classes of timber.

,, 27.—Statement showing description of work done, &c., during 1871-72.

,, 28.—Annual amount of forest revenue.

Value of timber in hand.

SECTION I.

Inspection of Forests.

Cooch Behar, Sikkim.

8. In this district there was no special inspection of forests, as this work had been done during former years, and all forests in Sikkim the property of Government have been included in, and notified as "Reserves." Those in Bhútan have been all inspected, and the western portion more or less traversed during the year by the Assistant Conservator, whose active habits carry him over every part of his division. A short description of each tract in Sikkim and the Western Dooars, as given by the Assistant Conservator in his report, is given as an appendix.

9. In Bhútan the forests have just lately been gazetted as open Government forests, and from them special tracts will be selected as "Reserves." It is proposed to commence the regular detailed inspection and surveys in the Moraghat tract next season if a competent and experienced officer can be placed in charge of the division, there being only a Sub-Assistant in charge at present.

Bhútan forests gazetted as open forests.

Assam

10. As was stated in a previous report, the general inspection of forests in Assam terminated early in 1871, when a detailed survey of certain tracts was commenced. The work was interrupted by the departure of the divisional forest officer on sick leave, and was not taken up again until January 1872, when a survey of forest tracts in the Dhunsiri river, Sibsaugor district, by Mr. Forrest, and in the Kamroop Dooars by Mr. Aylmer, was commenced, with a view to selection of Reserves. Selections have been made during the past season in both these districts, and the reports have been submitted to the Commissioner of the division for consideration. One of the Reserves has been approved by the Commissioner, and will be immediately taken charge of by the Forest Department.

Inspection of Jeerung forests.

11. Together with other forests in Kamroop, the Jeerung forests, referred to in paragraph 4 of last year's report, were inspected with a view to ascertaining their value and drawing up a report for the orders of Government regarding their management. Detailed information regarding this inspection has not up to date been received, as the report has first to go to the Commissioner of the division for his opinion, after which it will be submitted to Government.

Dacca division, Sylhet.

12. Mr. Shakespear traversed the tract of country to the south-east of the district of Sylhet, bordering on Cachar and the territory of Tipperah. Extracts from his report giving, though in a rather desultory manner, a good deal of information regarding the tracts he visited, will be found in an appendix to this report. From what he states it is evident, as was supposed, that the country has been almost every where cleared of its forests by the usual methods, *i.e.*, jhooming and indiscriminate felling and waste.

Supplies of forest produce.

13. There appears to be a large supply of timber from Cachar, and the demand in the district, where great numbers of boats are built and sold for river traffic, far and near, is very considerable. The supplies of other forest produce, such as bamboos, grass, wax, and lac-dye, together with India-rubber and a kind of incense obtained from the Ajan tree (Aquilariasp), are in the aggregate considerable.

No forest revenue in Sylhet.

14. Government, however, except at the Sealtek Ghât, where timber and bamboos passing down from Cachar pay river toll, obtain no revenue either from timber or other forest produce in the district. The land in Sylhet seems to be chiefly the property of zemindars whose estates are settled decennially, and the Government rights to portions of the forests seem to be undetermined, as is also the boundary line, except at certain points between British territory and Hill Tipperah, so that it will take time before any very satisfactory steps for protection of timber can be taken. The Assistant Conservator mentions that restrictions have been placed by the Collector on the felling of timber. The nature of these restrictions, as also of the rights of Government, are at present subjects of inquiry.

Difficulties in travelling.

15. The Assistant Conservator had to undergo considerable hardships during his journey owing to the general unwillingness of the zemindars to assist him with coolies or supplies of food. These difficulties, however, will be lightened hereafter, as he will be better prepared for the nature of the country to be explored.

CHITTAGONG.

16. In this division Mr. H. H. Davis explored the forests on the Kurnafoolee river and its tributaries, the Remgkeong, Soobalong, Kassalong, and Myanee, and also between the Burkal and Demargiri mountains. His linear valuation surveys show the existence of considerable quantities of the valuable kinds of timber in these tracts. These surveys extended along 44 miles of forest, equal to an area of 831 acres, on which 750 first class, 695 second

class, 1,113 third class trees, and 5,783 saplings, were counted, or an average of 27 trees to the acre, besides saplings. The proportion of saplings is very marked (nearly nine times as much as the first class), and if the surveys show even approximately the standing timber, these tracts are valuable. Proposals for Reserves in them are now before the Commissioner of the division for consideration. The proportion of trees standing would lead to the impression that these forests had many years ago been heavily worked, and had afterwards been abandoned on the discovery of more accessible tracts. The large timber was, together with the then second class timber, probably felled and removed, and the present stocks, which were at that time probably third class and saplings, have now become second and third class, with the addition of a large stock of saplings.

Bhaugulpore inspection of the Brahmini river.

17. The Officiating Deputy Conservator, Captain Losack, was employed during the rains on a journey down the river Brahmini, from its head waters at the Koel down to Cuttack, for the purpose of inspecting it to see whether it was suitable for the transport of timber, there being immense stocks of Sâl in Sarunda which have not hitherto been tapped. He passed down the whole length of the river to Cuttack and submitted a report (appendix), which was considered sufficiently favorable for sanctioning an experiment, and accordingly Government sanction was obtained to the felling of 50 trees to be floated down during the following season.

Timber operations.

18. By the time Captain Losack was able to reach the scene of operations (March), the rivers had reached their lowest point, and much difficulty occurred in getting the large logs he had felled into a main stream and to a place of safety, whence it could be floated down during the rains. The water had to be backed up by throwing dams across the streams, to enable the workmen to move the logs on from pool to pool. This and other difficulties incident to the introduction of a new kind of work were, however, with praiseworthy determination, gradually overcome, and with the assistance of the elephants employed in pushing and dragging, the 50 logs were at length got to a place of safety, and ready for floating so soon as the streams will admit of it. The climate in Sarunda is unfortunately very pestilential,—even during the least unhealthy parts of the year; and all the people taken by the Deputy Conservator to the district fell sick, he however escaping. The Commissioner remarks as follows on the subject:—

"One great difficulty will, I fear, be found in the unhealthiness of Sarunda. I had a large number of fever cases in camp while in the pergunnah, and for many days after I had emerged from it; yet I could not have chosen a more favorable time for my visit."

Inspection of private forests.

19. During the dry season the Deputy Conservator was occupied in inspecting forest tracts the property of private individuals in Patna division, Government having called for a report on the forests of the settled districts. He visited portions of the Patna, Gya, and Shahabad districts, after which his further journey into Chumparun was stopped on his receiving orders to proceed immediately to Sarunda to fell timber.

20. Among the appendices will be found a tabular statement giving details of the private forests in the Bhaugalpore division, and also a detailed statement regarding stick-lac, furnished by the Deputy Conservator in reply to questions sent to him.

Protection of Urjoon Sing's forests.

21. Referring to the forests belonging to one Urjoon Sing (mentioned in paragraph 30 of report for 1870-71), on reference to the Deputy Commissioner, Singbhoom, he reports that the difficulty of getting at these forests had hitherto protected them, and that nothing more has been done than to stop the tapping of the trees for collection of *dhuna*.

22. A report was submitted to Government in March last on the forests of the settled districts, and it appeared after inquiry that the only forest tracts in the settled districts in which Government have any rights at all were the following:—

Report on forests in settled districts.

Patna.—"Government has a proprietory right over some 19,000 acres in Pergunnah Rhotas and Chynepore; these rights are now being inquired into, and the exact tracts in which they exist are being ascertained."

Rajshahye.—"They own forests No. 5 and half of forests Nos. 3 and 4 in Bogra."

Dacca.—"They own half the forests in Sylhet. What the nature of this half ownership is, has not been explained."

23. *Cuttack.*—"In this division the destruction of forests in the Tributary Mehals was brought to the notice of Government by the Superintendent, and the following rules have been approved by the Government with a view to arresting further waste. The Superintendent writes that "as Government has no sort of right to enforce, or any means of enforcing, conservancy measures in this territory, nothing more can be done."

NOTIFICATION.

To The Tributary Rajahs of Cuttack.

"The great and unnecessary destruction of valuable forest timber trees through the Tributary Mehals has been noticed by Government and observed by me. Experience has shown that in course of time, as civilization and cultivation advance, serious inroads have been made on the heretofore uncleared forests, and every year good timber fit for building purposes is becoming more scarce and more difficult to procure. This is not the only evil. Denudation of timber on the hills affects the climate of the country, and also the rainfall, as well as the fertility of the soil. Moreover, the great store of timber wealth provided by Nature in these provinces is uselessly dissipated without any corresponding advantage accruing to Rajahs or people in this generation, and the next generation is moreover deprived of a valuable source of timber supply, and eventually, if the destruction proceeds, even fuel will become scarce."

"In issuing this notice Government has no desire to interfere in any way with the legitimate profits obtainable by the use or sale of timber by the proprietors of tributary estates; on the contrary Government desires to induce careful conservation of forests, so that timber may be allowed to reach maturity and its sale become a source of permanent income to the Rajahs, and at the same time benefit the country at large."

"The following are the chief causes of useless destruction of timber."

1*st.*—"The habit of cutting and clearing large tracts of valuable forests for toila or temporary cultivation. These toila lands are only cultivated for two or three years, when the land is exhausted and lapses into useless thicket and jungle. The profit derived from such cultivation is very small to the ryot and generally little or nothing to the Rajah or zemindar."

2*nd.*—"The practice of giving pottas, or permitting Sâl forests to be girdled for the sake of procuring dammer. Thousands of magnificent trees, worth, if sold as timber, very large sums, are annually destroyed to procure a few chittacks of dammer. It is known that extraction of dammer does not necessitate destruction of the Sâl trees, but that a good supply can be obtained by cutting merely a portion of the bark, extended over not more than ¼ of the girth of the tree. In a few years the cut heals over and the tree is again fit to yield resin; whereas if it is girdled completely the tree dies and no more resin can be obtained from it: thus the zemindar loses his valuable timber for the present, and also loses his revenue for the future. Every Rajah will in future prohibit the girdling of trees to procure dammer, and will set apart such tracts as may be suitable and do not produce the finest timber for extract of dammer."

3rd.—" Among many of the hill tracts some of the finest trees are felled to procure honey. The value of the honey is only a few pice to the finder, and the loss of a fine tree is irreparable to the Rajah. Felling trees for honey should be prohibited : a very little additional labor and pains would secure the honey without damaging the tree. Besides Sâl timber there are many other valuable woods, such as Teak, Sissoo, Kooroom, Assun, Abloos, &c., &c., which are similarly destroyed : in fact, the only trees preserved systematically are the Jack, Mowah, and Mango, and these are valuable not only for timber, but for fruit."

" The following rules are promulgated for the information and guidance of Gurjat Rajahs :"—

1st.—" Toila cultivation should be brought under the Rajah's supervision ; there are already vast tracts of scant jungle previously cleared available for toila cultivation. With these Rajahs should not interfere or prevent cultivation; but in future no Rajah should permit any new land to be cleared on which good timber is growing. Those tracts most remote from villages, and where fuel timber exists, should be carefully set apart, and the cutting of timber within fixed limits should be strictly prohibited. Without the Rajah's express permission—and this permission should only be given to cut trees which have attained a girth of not less than 3 cubits at an height of 3 cubits from the ground—all trees on the reserved tracts of smaller growth should be strictly preserved and not allowed to be cut until they attain a girth of 3 cubits. This prohibition will in no way affect the convenience of the people, who can cut poles, posts, and ploughshares as heretofore in the unreserved jungles and toila lands, and any sort of trees but those ordered to be preserved in other lands."

T. E. RAVENSHAW,
Superintendent.

OFFICE OF SUPDT., TRIBY. MEHALS,
CUTTACK,
27th February 1872.

SECTION II.

RESERVES.

COOCH BEHAR, SIKKIM.

24. Here, as has been before reported, all the Government forests are "reserved" forests. The area of the whole is about 72 square miles.

BHUTAN.

25. No selection of Reserves has yet been made in Bhútan. All the Government forests in the Dooars have been notified as "open" forests. Their boundaries are all fixed and, where necessary, mostly demarcated. Reservation of the richest portions within these tracts will commence next season. The total area of these forests is nearly 767 square miles :—

Eastern Dooars	342	square miles.
Western Dooars	425	" "
Total ...	767	" "

ASSAM.

26. In paragraphs 81 and 82 of previous report it was stated that the "numbar" forests in Sibsaugor and the Dooars in Kamroop had been set apart as Government Reserves so long ago as 1863, but that owing to want of reliable survey maps no boundaries had been fixed.

Selection of Reserves.

27. Government having approved a proposal to inspect the best forest tracts on the Dhunsiri river ("numbar forests") and also in the Nowgong district and Kamroop Dooars, Assam forest officers were directed to commence the work. Several tracts in Kamroop, and a large tract in the Naga hills and the Sibsaugor district, have been selected and reported on by the forest officers, whose reports

are now (after having been submitted to the Deputy Commissioner of the district) before the Commissioner for consideration. So soon as the orders of Government have been received, competent surveyors will be employed to survey the approved tracts in minute detail; while at the same time forest officers will make valuation forest surveys and carry on forest work with a view to preparation of a "working plan" for each Reserve.

CHITTAGONG.

28. Proposals for the reservation of certain tracts of forests visited last season are now before the Commissioner of the division.

BHAUGULPORE.

29. As regards the "reserved" blocks mentioned in paragraph 19 of the report for 1870-71, the Deputy Commissioner states that no establishment has been appointed to watch and protect the tracts, as in his opinion it would be waste of money to pay for watchers in such an out-of-the-way and inaccessible tract of country, and that a very fair supervision is now being exercised over the blocks by the sub-divisional officers, who have sent up people to court for cutting timber. But as in the same letter he speaks of jhooming as still being carried on in them, and that immense quantities of bamboos (about 3 lakhs) had been found cut without license, for which, on discovery, the cutters had been made to pay Rs. 1 per 1,000, it would appear that some watchers should be in charge, and the Deputy Conservator has been addressed on the subject with a view to coming to some agreement with the Assistant Commissioner as to the best arrangement to make to stop jhooming in the Sâl covered tracts.

Injury done by jungle fires.

30. This is perhaps the best place to refer to the subject of jungle fires and the injury they cause. The injury done to the forests by jungle fires is unquestionable, as is also the injury done by cattle grazing; but these are evils not easily overcome, as clearing tracts round Reserves would be a costly business, and, excluding cattle generally, would press very hard on the district population, and also upon owners of cattle, who send their herds periodically to graze in the jungle, where large quantities of "ghee" are manufactured and sent down to market.

31. The jungle fires are in great measure due to the owners of cattle, who set fire to the jungles as soon as the grass will burn—about February—in order to clear the land and let the cattle graze on the young grass, which comes up then. Village huntsmen also do a great deal of mischief by setting fire to patches of grass in order to shoot deer thus driven out of cover. These fires often extend over miles of country round, doing a great deal of mischief. Outside of the Government Reserves grazing is leased out by the district officers; and last year the grazing in the forests of the Dooars was let out by the Assistant Conservator for Rs. 2,704-12, as it is impossible to keep cattle out of Government forests unless an establishment out of all proportion to revenue be kept for the purpose, which establishment would probably be involved in endless collision with the cattle owners who had rented the grazing of the neighbouring land. The destruction done by the fires is not confined to the burning of seedlings, which come up plentifully every year only to be immediately burnt down or injured irrecoverably; they seriously injure also the trees growing, or rather standing, in the forests, for their appearance over whole tracts leads to the belief that the growth of the trees is absolutely stopped by the fires, which destroy all the young leaves and give the trunks of the trees a gnarled, knotty, and crooked appearance. Clusters of young shoots, striking out all along the trunk of the trees, which, with very few exceptions, over large tracts, have a stunted, unhealthy look, without leading shoots or crowns.

32. It is impossible to account for this state of things except as being caused by the yearly jungle burning. The grass is very heavy, and the heat of the conflagration must be intense and injurious to a very great degree, for the bark of the trees is blackened and charred sometimes more than 20 feet up the bole. Expense and regard for the cattle owners require that a regular and gradual

system only of protection of the forests from jungle fires should be adopted. Such a system may be introduced as Reserves are selected and the working plan of the forests after survey and marking off into blocks has been completed. Each year, as a block is marked or demarcated, means might be taken to keep out jungle fires from it by clearing round it and keeping a few extra watchers for three or four months on the spot. If this were done for five or six seasons consecutively, seedlings would spring up freely and assist in keeping down the grass. At any rate, it will be well worthwhile to try an inexpensive experiment, so as, if possible, to master a very great evil.

33. This plan, assisted by notices in the district that the setting fire to grass and jungles in certain areas, to be fixed each season in communication with the district civil officers, is strictly prohibited, will probably go some way towards effecting the desired result on a limited area. Indeed, the burning of jungle in places where prohibited for the time being might be made punishable under the forest rules by the introduction of a rule on the subject; but this evil is so great that means should be adopted to stop it generally in all the forests. Some further remarks on the subject will be found under Section VI, General.

34. From a perusal of some of the forest reports of the Central Provinces, it appears that some steps have been taken there to keep the jungle fires out of the forests, and that when so kept out, much advantage has been derived; but the experiment seems to have been costly, and over very limited areas.

SECTION III.

PLANTATIONS.

General remarks.

35. Up to the present time plantations have been merely experimental. As such, small plantations were commenced at various points, distant from each other, so as to test varieties of soil and climate, but on sites suited for the removal of timber by streams in case experimental success was such as to warrant extension of them. This is explained here, as it would seem from the Government resolution on the report for 1870-71, referring to the inadvisability of dotting plantations over the country, and in places where even the indigenous timber could not be removed, except at great cost, that the object of the small plantations commenced was in a measure misunderstood. Paragraph 23 of report for 1869-70, quoted in the margin, will show the intention for which they were made. In further explanation it may be here observed that although it may not just now pay to remove the indigenous timber from the Dehing forests, for instance in Upper Assam, it does not at all follow that if there were Teak forests on that river it would not pay to fell and remove the Teak. In the first place it takes some years to introduce new kinds of timber into a market, purchasers being shy of any untried timber, and the Assam timber is unknown at present; *secondly*, the valuable kinds (except Toon, which floats freely,) are for the most part of such specific gravity, that they will not float and must therefore be lashed to boats and taken down to market at great cost. It has been before observed that the expense and risks when dealing with logs of heavy timber are very much greater than when handling Teak or other woods which will float, and thus while it might be difficult to bring such woods as Nabor (*Mesua Ferria*), Ajar (*Lag. Reginæ*), Uriam (*Eugenia Jamboolana*,) &c., to markets and sell them at a profit, Teak might be brought down from the same places for sale and produce a very satisfactory return. All that is required is good water carriage, and this is found to perfection in Assam, Cachar, Chittagong, and parts of Bhútan, in all of which provinces the soil and climate invite the planting of Teak.

"These scattered little plantations have been made simply as experiments from which to collect data for future operations and thus not to lose time. It is not proposed to scatter Teak plantations all over the country, but it is of importance at once to sow Teak and test the soil and climate suited to it here, as it will be advisable hereafter to select certain compact localities in each province suitable for the growth of Teak and carriage of timber for future supplies, Teak being from its lightness easy to float in rafts and transport to any markets, while its qualities as timber are unsurpassed for almost all kinds of building and shipping purposes."

Cooch Behar.

Rungbool plantation.

36. The plantation at Rungbool is reported to have been increased by 60 to 70 acres during the year; that is to say, that from 60 to 70 acres of land, which had been cleared formerly, was planted out with Magnolia seedlings from a nursery that had been prepared near the spot to fill up vacancies in the old plantation.

37. The Conservator did not consider it any use to fill up the vacancies in the old plantation, and desired the Assistant Conservator, as the plants were ready in the nurseries, and the expense of clearing the ground had during a former year been incurred, to plant up the cleared space.

38. This plantation has not been visited by the Conservator during the past year, but it was reported on by Dr. King under instructions given by the Bengal Government. The report does not speak favorably of the plantation, and it will not be further increased, nor will any further expense be incurred upon it. It will simply be protected from injury, and will from time to time be planted up, where vacant, with such Pines and other young trees as the Cinchona Department may have ready for the purpose. The Government of Bengal have issued instructions for the formation of nurseries for various kind of British and foreign trees which are to be tried in the hills

Dhoobee Jhora plantation.

39. In addition to the Rungbool plantation another, on the Mahaldaram, at "Dhoobee Jhora," was discovered this season by Mr. James, the Assistant Conservator, on the report of a man formerly employed in the department. How it has happened to be overlooked, it is difficult to say. On this matter Mr. Mann, on his return from Europe, will be able to give explanation, as he planted it. The trees are probably the produce of some of the seeds sent out by the Secretary of State in 1865, and were probably transplanted in 1866. After visiting this plantation in December the Conservator gave orders to have the plants cleared, and the following is the result as given by the Assistant Conservator after clearing the trees. The plants are believed to be of the following three kinds:— *Juniperus Virginiana, Juniperus Dunorphus, Cypressus Torulosa.*

40. The area is about 42 acres; number of plants 3,584, with intervals of from 20 to 25 feet; at what intervals originally planted, is not known.

41. The junipers are the largest both in height and girth, averaging 11 feet 4½ inches in height and 9¾ inches in girth at the ground. The Cryptomerias are not above 4 feet in height and 2 9/10 inches in girth at the ground.

42. The following statement shows actual measurement of 20 of the largest young trees.

43. Measurement of 20 plants at Dhoobee Dhura Plantation—

No.	Height.		Circumference at foot.		No.	Height.		Circumference at foot.		Remarks.		
	Ft.	In.	Ft.	In.		Ft.	In.	Ft.	In.		Ft.	In.
1	15	6	1	0	12	12	6	1	0	Average height of		
2	14	0	1	6	13	12	6	0	9	the largest tree is	11	4½
3	12	6	0	10	14	11	0	0	8	Average girth of		
4	12	6	0	10	15	11	0	0	7	the largest tree is	0	9 2/10
5	12	0	1	0	16	11	0	0	7			
6	10	0	0	9	17	11	0	0	7			
7	10	0	0	9	18	11	0	0	7			
8	9	6	0	8	19	10	0	0	7			
9	13	0	1	0	20	10	6	0	7			
10	9	6	0	8								
11	8	6	0	7		227	6	15	6			

Bamun Pokree.

44. During the year nine acres were added to the Teak plantation at Bamun Pokree; the plants were taken from nurseries. The nursery had not been very judiciously chosen, and the seeds did not germinate freely the first year; but they are now coming up in considerable numbers. This is often the case with Teak, as the nut is very hard, and frequently does not come up until the second year. Dr. King reports these transplants in December as doing well; but when the plantation was visited by the Conservator soon afterwards, he did not form this opinion of them, as the plants showed the sign which all Teak exhibit when they have been transplanted too late,—their leading shoots were mostly injured, and the leaves small and in clusters, instead of being large and at regular intervals. The young trees on the original plantation are, as the report states, models of health. There is irregularity in the growth arising from some of the plants having been put out into vacancies subsequently to the formation of the plantation. Some doubts exist as to whether the original plants are from seeds sown *in situ* or transplants from seed beds. The question is one of some importance, as opinion is divided as to whether it is best to sow Teak where the tree is intended to grow, or to transplant it from a nursery. On the return from leave of Mr. Mann, who directed the operations, the doubt will be settled. This plantation now covers an area of about 14 acres. It has lately been put in charge of the Cinchona Department, as the services of a trained gardener to superintend the planting have not been obtainable, and success and economy cannot be secured under local officers entirely untrained to the work.

45. Between 60 to 70 acres were cleared and prepared for planting this season before the plantation was taken charge of by the cinchona establishment. Ample supplies of seed have been obtained from Burmah to stock the ground, and no doubt under the care and experience of skilled labour the plantation will steadily extend and become of importance.

New plantation near Fallacotta, E. Dooars.

46. A new experimental Teak plantation at Fallacotta, Western Dooars, is being commenced this season with the sanction of Government.

New India-rubber plantation

47. A small plantation of India-rubber, on a spot selected near Sivoke, is being formed this season. The expense will be trifling, and it seems of some importance to test the growth of the tree from cuttings and the expense attending the work without loss of time.

Expenditure.

48. Expenditure on plantations in Sikkim during the year was Rs. 3,470, as detailed in the statement below.

FOREST DEPARTMENT, BENGAL.

Statement of Expenditure on Account of Plantations in the Cooch Behar Division during 1871-72.

Bamun Pokree Plantation.		Rungbool Plantation.		Miscellaneous.		Total
Description of Work.	Amount.	Description of Work.	Amount.	Description of Work.	Amount.	
	Rs. A. P.		Rs. A. P.		Rs. A. P.	
Clearing jungle and hoeing ...	1,446 6 0	Clearing jungle and hoeing .	530 15 0	Collection and carriage of seed	51 9 0	
Transplanting ..	409 13 0	Transplanting ...	778 12 0	Salary of watchers, coolies, and others	137 11 0	
Purchase of seed and seedlings	.....	Purchase of seed and seedlings .	115 2 0			
Total ..	1,856 3 0	Total ..	1,424 13 6	Total .	189 4 0	3,470 4 0

49. This expenditure is far greater than it should have been, and shows want of care and attention. It must be admitted, however, that it is impossible for one officer alone to be present at all points of such a large division as Cooch Behar, and an assistant is very much required to take charge of the tracts across the Teesta river.

Remarks on expenditure.

50. Oridinarily a plantation, if of Teak, exclusive of surpervision, should not cost more than Rs. 30 to 35 per acre: thus—

	Rs.	A.	P.
Cutting jungle	2	8	0
Part hoeing	3	0	0
Making holes for transplants	5	0	0
Lining and staking and sowing seeds	13	8	0

For Tea planting there is an extra expense of some Rs. 5 per acre for burning and digging out roots, which however is scarcely necessary for a timber plantation; but supposing this work be done, there should not be an expenditure of more than Rs. 18-8 per acre for preparing the ground and sowing the seed. If transplanting from nurseries is done, then Rs. 3 per acre should be added.

The plantation will require clearing for three years,—say three times the first year, twice the second year, and once the third. This at Rs. 2 per acre would add Rs. 14, giving a total of Rs. 35-8 per acre at the end of three years, when Teak will take care of itself.

51. Slow growing trees, however, cost a vast deal more, owing to the number of years they require to be kept clear from jungle.

Assam.

52. The plantation, about 4 acres, on the Dehing at Makoom, planted in 1869, is flourishing. Mr. Forrest, who was desired to report on it, says that the young trees (three years' old) average 20 to 25 feet in height and are 8 to 11 inches in girth at 1½ feet from the ground. Why he should have chosen such a height from the ground for measurement, is not clear. This girth in proportion to height would indicate that the young trees are standing too close together, and require thinning. He does not give the distances between the plants.

Makoom plantation on the Dehing.

53. Between 20 and 25 acres were prepared for planting last year, and Teak seed from Burmah was sent up to stock the land. The sudden departure of Mr. Mann, the Assistant Conservator of the division, on sick leave, almost entirely put an end to all planting. The work fell into the hands of a forester who had been for a long time in the department and knew the work well, but he did very little, and at such a distance up country, could not be readily communicated with. He has since been dismissed. Mr. Forrest reports that some 3,500 seedlings were planted out, 50 being put into vacancies in the old plantation, but he does not give the area occupied by them. The expenditure in Assam under this head was Rs. 353.

Shillong.

54. The Lieutenant-Governor having expressed a wish that a plantation should be formed at Shillong, the Conservator, in communication with the Deputy Commissioner, selected a tract of land covering some hundreds of acres just beyond the station, and which the native chief was willing to transfer on a perpetual lease at moderate rent.

55. The Commissioner's approval having been obtained, with the sanction of Government the land has been taken up on lease. Seeds of various kinds, as per margin, were sent for from England in October. These have since been received and sent up to Shillong, as ordered by Government, as the plantation is to be in charge of the Deputy Commissioner. Some portions of the seeds were distributed to the

Mountain Ash.
Scotch Fir.
Silver Fir.
Larch.
Ash.
Wellingtonia Gigantia.

Cinchona Department for trial in Sikkim. We may therefore look forward with interest to the result of these operations in a few years.

CHITTAGONG.

56. In this division a small plantation was tried on the plan of cultivators planting Teak with their crops. After much talk they were induced to try, and they carried away 25 seers of seed to plant; but the results were very trifling, as only 290 plants are now living. The Assistant Conservator reports the plants as being 2 feet in height and very healthy. Besides this, a small nursery was formed by daily labor at Seetapahar on the Kurnafoolee river. There the seeds came up most profusely, but he only succeeded in planting out 250 plants, leaving 400 to 500 in the nursery. These plants are also all very healthy, and average 2 feet in height.

New nurseries this season.

57. During the past cold weather two more nurseries to hold about 5,000 seedlings have been prepared at Seetapahar, as also 8 acres of land cleared and prepared for planting these out and sowing seeds *in situ*, obtained from Burmah. The results will be communicated in next report.

Kurnafoolee river favorable for timber floating.

58. It has been before remarked that the Kurnafoolee river is peculiarly favorable for timber floating operations; and as the port is a good one for shipping timber, probably Chittagong would prove a favorable division for extending plantations.

Expenditure.

58. Expenditure under plantations in this division amounted to Rs. 235.

Planting by Irrigation Department.

59. It may be well to add here, while on the subject of plantations, that there has been some correspondence with the Irrigation Department, Public Works, regarding plantations along the sides of canals, and that the Superintending Engineers of the Soane and Orissa circles have applied for seeds of Sissoo and Toon. In anticipation of these demands by the Irrigation Department, supplies of seeds of Sissoo, Toon, and Teak, were collected, and have been forwarded; but it is feared that the planting will be rather late this season.

In future, details of cost of work to be given.

60. In next report the expenditure will be under separate heads of work, in detail, so as to give clear information of cost of each kind of work on each plantation and arrive at a clear rate per acre. On small experimental plantations such detail would only mislead, as they are necessarily much more expensive than extended plantations with regular labour in them, and the expenditure on each work cannot be easily stated.

SECTION IV.

YIELD OF FORESTS.

COOCH BEHAR.

Timber operations.

61. In this division operations were limited, like the previous year, to bringing to depôts timber felled during former years. Details of the work done will be found in statement No. 27.

62. Besides those operations, an agreement was entered into with an European to bring down timber from the outer hills, where it had been felled in 1866-67, and where it was subject to being burnt or lost through land-slips and other causes. The timber was to be paid for at the rate of 9 annas per cubic foot, and advances, not to exceed a total of 10 annas per cubic foot, were to be made to the purchaser in instalments at certain specified places for bringing the timber to sale depôts, where it was to remain the property of Government and not to be removed until the advances were recovered and the value

of the timber fully paid. It was hoped that as the person with whom the agreement had been made was well acquainted with the localities, having formerly worked there with a partner before a Forest Department had been introduced, he would succeed in his undertaking, and that he might hereafter become a permit-holder or contractor to extract timber from the forests, thus freeing the forest establishment from a great deal of work which prevented their being employed in more strictly conservancy purposes. The results, however, of the experiment have not been satisfactory, inasmuch as the contractor and purchaser has spent a considerable sum of money of his own in the undertaking besides the advances made to him by Government, and after disposing of some logs at Purneah and Dacca (all of which have been paid for and advances on them recovered), he has been obliged to give up the work owing to want of funds, the Forest Department being unwilling to make any further advances. The advances still outstanding, as also the original value of the timber, are recoverable by work done and sale of the timber in the hands of Government.

All stocks of timber verified.

63. Mention was made in the report for 1870-71 that there had been no verification of the stock of timber said to be in hand at the various forest depôts, although counting of all timber had been ordered in 1868-69.

64. During the season of 1870-71 Mr. James, the Assistant Conservator, endeavoured to count the timber, but could not complete the work. Every search has now been made in the various places where timber was originally felled, and all logs have now been accounted for. 1,500 sleepers, not hitherto brought on to stock, were found, and have been brought to account.

Certain places fixed upon as depôts for timber

65. Certain recognized depôts have now been decided upon at which timber is to be taken over, and no timber is to be entered on stock except when lying at these depôts. When first timber was felled in Sikkim, every place where timber was felled was called a depôt, and thus it happened that proper supervision could not be exercised, and great confusion was the result.

66. The depôts are now as follows :—

"*Forest Depôts*," where timber may be taken on stock and on arrival, at which contractors' accounts may be settled.

1. Mechi river, for Loharghur forests.
2. Sookna, Gulma, and Sivoke, for tracts between Mahanuddy and Teesta.
3. Ramshi Haut, for Ramshi forests.
4. Hurdi-Bari, for Buxa forests.

Station Depôts.

1. Siligoree.
2. Julpigoree.
3. Doodoa, near Fallacotta.
4. Alipore.
5. Ragapathkowa (Buxa).

Logs lost in Teesta during former years, recovered

67. Several logs lost during former years have been recovered from the Teesta this year. During the heavy waters they had evidently got moved in the pools in which they had originally sunk, and through some change in the currents got brought down to a "flat" below some of the last rapids before the river enters the plains, and were, on being discovered in the still water, recovered and brought to depôt at Sivoke. It is very probable that more logs will be recovered in the same way.

68. Miscellaneous collections under heads "permit fees," "rent paid by squatters," "grazing dues," and "licenses to cut bamboos and fire-wood," amounted to Rs. 3,999, exclusive of India-rubber. In the two previous years they amounted to Rs. 3,414 and Rs. 3,424.

Miscellaneous collections.

69. The collections of India-rubber amounted during the year to 286 maunds, the cost of which was as follows:—

Collections in India-rubber.

		Rs.	A.	P.
Paid to Collectors at Rs. 10 per maund	...	2,860	0	0
Packing and delivery at Calcutta ...	...	897	0	0
Total	...	3,757	0	0

The amount realized by sale was Rs. 18,136-13-0, being at an average rate of Rs. 63-6-0 per maund.

70. The first collections on India-rubber in Cooch Behar were made in 1870-71, when the samples sent to brokers were valued at Rs. 45 per maund. Great improvement in the collection this season has taken place, as stringent orders were issued to compel the collectors to keep it quite free from any mixture with chips, earth, or other foreign matter. The result has been that the gum fetched as much as Rs. 64 per maund, and has been pronounced the purest which has come to market.

Improved value per maund.

71. Tapping was only allowed for four months, from 15th November to 15th March 1872. Information has lately been received to the effect that the success attending the collection last season in the Government forests have stimulated others to employ men in collecting beyond British territory, and Rs. 20 per maund is being paid to Collectors, whereas the Forest Department have hitherto only paid Rs. 10.

Collection undertaken by private parties.

72. This rivalry will probably increase the expenses attending future collections, and may give trouble in the way of protecting the trees in British territory the property of Government, necessitating an increased number of watchers.

Probable increase of expense in collecting.

73. It is estimated that there are 6,000 India-rubber trees on the west side of Teesta, and about the same number on east side, as far as Chel river. Of these about one-half are of the small-leaved kind, which yields only half the quantity of milk which the large-leaved kinds yield.

Estimated number of trees in Cooch Behar and yield of gum per tree.

74. An ordinary sized tree (large leaf) gives about 15 seers of milk, which, when dry as India-rubber, is reduced to 8 seers.

ASSAM.

75. It was shown in the preceding year's report 1870-71 that 510 trees, producing 1,086 logs, had been felled on three streams, viz.—

Timber operations.

The Debroo	150
„ Dehing...	734
„ Dhunsiri	202
Total logs ...	1,086

and that of these 670 had been dragged to bank of river ready for floating down to depôts. During the year the following logs were brought to depôts :—

Debroo depôt	78	logs.
Dehing ,, ...	245	,,
Dhunsiri ,, (Golaghât)	242	,,
Total logs ...	565	

many of them dragged to the bank of rivers.

Timber sold.

76. Of this timber 89 logs were disposed of to the Public Works Department at Golaghat, and 15 were carried away by the streams and lost.

General remarks.

77. These operations, owing to the absence of the divisional officers, already referred to, suffered in some degree before the services of an overseer could be obtained to take charge of them as a temporary measure, pending the arrival of another officer, and they were stopped by Government so far as any extension of them was concerned. This experiment, the object of which was explained in paragraphs 119 and 120 of last year's report, and carried on under very unfavourable circumstances, rather encourages the idea that timber operations in Assam may eventually prove remunerative.

78. The temporary overseer put in charge of the work seemed to find no difficulty in obtaining labour from the neighbouring villages, and the men seemed perfectly happy in the jungles during the rains. The rate of pay given was 3 annas per man, and 4 annas for a rough carpenter.

Cost of work.

79. The timber now at depôts has cost Rs. 4-3-10 per log (averaging 17½ cubic feet); this gives a rate of 3 annas 10½ pie per cubic foot, which is a low rate for the commencement of work. It must be stated, however, that the timber was not dragged any great distance to river bank, and that some advances, to the extent of Rs. 476, still outstanding, may not all be recoverable from the contractors, and may eventually have to be charged to the timber. A forester, since dismissed, made these advances while temporarily in charge, and did not take sufficient care to see that the work was done. The orders regarding stoppage of the work, too, naturally damped all hopes, and the contractors could not be got to finish their work. The Assistant Conservator will file civil suits against those who are able to pay.

Disposal of the timber.

80. There will perhaps be a market at Golaghat for all timber at that depôt, and that still lying in the forests may with advantage be brought down to the depôts if only for Government purposes. A number of light logs (215) with which to float this timber to Golaghat, such as *Poma*, *Credrela Toona*, *Hooklook*, &c., were felled during the season, and will be available for floating the heavier logs, besides being of some value at the depôt for sale. The breaking up of the Dehing Saw Mill Company has disappointed the hope of their taking over the Dehing timber, as was proposed when it was felled, and this timber, unless the saw-mill is started again, will have to be rafted down to stations below for sale, if natives who are occupied with timber operations cannot be induced to take it.

81. The Debroo logs will find a sale at Debrooghur on being taken to the station. The Assistant Conservator does not appear to have chosen wisely as regards a timber depôt, having selected a place nine miles above the station of Debrooghur, where timber cannot be sold.

Sâl felled in Kamroop.

82. Some logs of Sâl have been felled during the past cold season for local purposes under orders of the Commissioner, as suggested by the Conservator, in the Kamroop Dooars, but detailed information regarding expense and number of logs has not yet been received.

Expenditure.

83. The expenditure under AI, timber expenses in Assam, was Rs. 1,302.

Management of India-rubber forests.

84. The subject of how best to manage the rubber forests and collect the revenue is a very important one. A memorandum has been submitted to Government, in which proposals were made for the management and improvement of the India-rubber forests. The difficulty in the management arises from the fact of our territory on all sides being surrounded by India-rubber-producing country, on which no import duty is levied. If our trees are tapped, and a man is found in possession of the gum, he immediately states that he collected it outside of English territory, and there is no means of proving that he did not, as it would be impossible to keep a strict watch over our trees, which are scattered along the whole line of frontier, beginning at Nepal and going round the whole of Assam and Cachar. If any import duty were levied, even only as a means of check, it would greatly facilitate matters; but there appear to be objections to this. On the other hand, it must be admitted that we get higher prices from the native mahajuns, who bid for and purchase the right to collect India-rubber in British territory, as it practically gives them a monopoly of the imported gum, all of which they purchase.

85. Civil officers' collections on India-rubber by sale of mehals were as follows during the year:—

Division.	District.	Amount collected. Rs.	A.	P.
Assam	Naga Hills	1,050	0	0
	Durrung	14,219	0	0
	Nowgong	168	0	0
	Luckimpore	4,000	0	0
	Total ...	19,437	0	0

86. If properly managed, and the planting of trees carefully attended to, there is no doubt that the produce would return a very large revenue in some 30 or 40 years' time, for India-rubber is coming more into use year by year in almost every species of manufacture and for all kinds of purposes.

Chittagong collections of revenue on forest produce.

87. The collections on forest produce coming down the rivers of this division amounted to Rs. 47,271, of which Rs. 41,544 were paid into the treasury, the balance Rs. 5,553 being in transit to treasuries at the end of the year. Formerly Government received little more than Rs. 10,000.

Toll stations taken charge of by Forest Department.

88. Five of the river toll stations were taken charge of by the Forest Department on the 1st April 1871, with the sanction of the Commissioner of the division, and the new rates of toll, sanctioned by Government letter No. 367, dated 27th January 1871, were immediately introduced. At first some opposition was shown by the wood-cutters, but this under judicious treatment disappeared, and the collections of revenue were made without loss. As no establishment had been sanctioned for the stations (for the revenue was formerly collected by the local Rajahs, who farmed the tolls,) the forest establishment sanctioned for the forests and not then required for conservancy purposes was, with the sanction of Government, employed under Mr. H. H. Davis, the Assistant Conservator of the division, to collect the tolls.

Fenny river tolls not collected by Forest Department.

89. The Fenny river tolls were not taken over, as it will be necessary before doing so to come to some arrangement with the Tipperah Rajah, whose territory lies along the east bank of the river, in order to prevent confusion. The collections on this river are still made by a local Rajah, and are not shown in forest accounts. They will probably show considerable increase if a proper establishment be appointed to take charge.

90. Besides the six large rivers above mentioned, in which tolls are collected, Mr. Davis mentions the following small rivers down which forest produce is brought, viz. the Surta, Droong, Kalapaneah, Silock, Hunga, Tankawatty, Eadgong, Razoor, and Naaf; on these there is not at present any revenue collecting establishment.

Smaller rivers down which forest produce is brought, but tolls not collected

91. The mode of procedure under which wood-cutters are allowed to go up into the forests may be thus described:—

Procedure adopted for collections of tolls.

92. Certain headmen, called Capitans, go up with gangs of wood-cutters to fell and purchase timber from the hillmen, who prepare it for them far away in the hills, often ten and twelve days' journey. Before going up they have to register a hammer-mark by which their timber can be recognized at the toll station. For registry of this hammer a fee of Rs. 5 is paid; they also pay head-money for each coolie they take with them at the rate of 8 annas per man. This establishes a check over all people going up into the forests.

93. Upon these fees being paid a "pass" is given to the "Capitans," on which certain rules and restrictions are endorsed. This pass must be shown to the civil officer on the way up, and it is endorsed by him. When the produce comes down, it is paid for at the toll station at certain rates fixed by Government. The pass is recovered and a certificate that the revenue due has been paid on certain produce is given in exchange. This certificate is examined at the station where the produce comes for sale.

94. Although matters on the whole appear to have gone on pretty smoothly during the first year, the system requires further organization if it is to continue, and rules will have to be sanctioned under which summary fines and confiscations can be enforced in case of attempted fraud or abandonment of the produce brought down, as it would be endless—indeed impossible—to take such cases with witnesses to a court.

95. Pending final settlement of a fixed system of forest conservancy in this division, an increase of establishment has been applied for, as the sums collected in cash are large, and the toll stations unavoidably situated in isolated places.

The toll stations are the following on the—Kurnafoolee, Sungoo, Marmoree, Bagkhalee, Hulda.

96. The Lushai expedition had no doubt some effect in checking the revenue collected during the past year, which however was considerable and shows a very large increase over former years, the rates collected on the different kinds of produce having been adjusted more proportionately to the value of the produce brought down.

Revenue checked last season by Lushai expedition.

97. The following statement shows the market value of the timber and the rates of toll collected per ton.

Statement showing value of timber at market and collection per cubic foot made on it.

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Description of Wood.	Market Value of Round Logs.			Market value of planks, beams, &c., per cubic foot.	Rates of toll collected.
	Measurement.		Value.		
	Cubit.	Cubic foot.	Rs. As. P.	Rs. As P.	
Jarool	1 × 4	=3′ 4″ 6‴	2 8 0	1 8 0	
Champlia	1 × 4	=3′ 4″ 6‴	2 0 0	1 4 0	
Kandeb	1 × 4	=3′ 4″ 6‴	2 0 0	.....	*1st Class.*
Soorujbeth (Toon)	1 × 4	=3′ 4″ 6‴	2 0 0	1 4 0	At Rs. 9-6 per ton, or 3 annas per cubic foot.
Chekarossoe	1 × 4	=3′ 4″ 6‴	2 8 0	1 4 0	
Gumar	1 × 4	=3′ 4″ 6‴	2 0 0	1 4 0	
Telsar	1 × 4	=3′ 4″ 6‴	2 0 0	1 4 0	
Boelsur	1 × 4	=3′ 4″ 6‴	1 12 0	0 12 0	
Jam	1 × 4	=3′ 4″ 6‴	0 8 0	0 8 0	*2nd Class.*
Gurjun	1 × 5	=5′ 1″ 3¼‴	2 0 0	1 0 0	At Rs. 7-6 per ton, or 2 annas 3 pie per cubic foot.
Thalee	1 × 4	=3′ 4″ 6‴	1 8 0	1 4 0	
Pitraj	1 × 4	=3′ 4″ 6‴	1 8 0	1 0 0	
Koroe	1 × 4	=3′ 4″ 6‴	0 12 0	0 12 0	
Bundercolah	1 × 4	=3′ 4″ 6‴	0 8 0	0 8 0	
Oorlum	1 × 4	=3′ 4″ 6‴	1 0 0	0 8 0	
Bohul	1 × 4	=3′ 4″ 6‴	1 0 0	0 8 0	*3rd Class.*
Vooga	1 × 4	=3′ 4″ 6‴	0 8 0	0 8 0	At Rs. 4-11 per ton, or 1 anna 6 pie per cubic foot.
Hurritokey	1 × 4	=3′ 4″ 6‴	1 0 0	0 8 0	
Kurful	1 × 4	=3′ 4″ 6‴	0 8 0	0 8 0	
Vadee	1 × 4	=3′ 4″ 6‴	0 12 0	0 8 0	
Cuakoos	1 × 4	=3′ 4″ 6‴	0 8 0	0 8 0	

H. H. Davis,
Asst. Consr. of Forests, Chittagong Division.

98. The collections during the first two months of 1872-73 have amounted respectively to Rs. 6,178 and Rs. 12,044-3,—total Rs. 18,222-3-0.

Collections during two months of 1872-73.

99. Although forest conservancy may appear to have been neglected, as the only measure towards protection of the forests has been the restriction in the size of trees to be felled of the different classes, this restriction has operated for good, as from the Assistant Conservator's report it appears to have considerably checked the outturn of timber of small size, and thus in proportion preserved the stocks still standing. He reports that where formerly some 3,544 logs came down, only 916 have been brought down during the past year. This decrease, however, may in part be accounted for by the Lushai expedition, which no doubt kept many of the wood-cutters from the forests.

General remarks.

100. It must be admitted that the protective measures are at present very indifferent, but the frontier tribes are such that it will not be possible to do much to protect the forests outside of a limited and reserved area.

101. The initiatory steps taken have been merely to obtain some kind of check over the Capitans and wood-cutters who go up to fell and purchase. As the Government forests gazetted in February 1871 were not declared to be "open" forests (the Forest Rules at that time not having been published), the Forest Department have no defined authority in them under the local rules. It has been proposed to Government now to declare them "open" forests under the rules, so that the valuable kinds of timber in them may be protected. As the tract is a very large one, it may be thought advisable to select certain portions which are to be "open" forests.

102. Reserves are being selected, and are now under consideration, as has been already mentioned in section 2.

Statement showing amount collected under different heads.

103. The following statement shows the produce brought down during the year and the collections made under each head. No reliable statistics on this subject were formerly kept:—

Detailed statement of Revenue received in the Chittagong Division on Forest Produce realized during past year, 1871-72.

Description.	Quantity.	Measurement.				Amount.		
		Tons.	Ft.	In.	Pt.	Rs.	A.	P.
Timber in logs	916	433	6	0	9	3,419	15	0
Scantlings and planks	9,305	841	0	1	9	7,282	9	6
Boats	106	244	36	6	11	2,057	14	0
House posts and saplings	8,039	...	...	...	...	1,018	6	2
Unclassed woods	267	...	...	...	...	200	4	0
Bamboos	7,853,031	...	...	...	...	19,552	0	6
Grass, bundles	3,227,239	...	...	...	...	4,840	11	3
Canes, bundles	1,529,429	...	...	...	...	1,530	0	3
Hammer and permit fees	.....	...	...	...	...	7,336	8	0
		Grand Total ...				47,238	4	8

CHITTAGONG,
The 16th May 1872.

H. H. DAVIS,
Asst. Consr. of Forests, Chittagong Division.

Detailed statement of kinds of timber, quantities, &c.

104. The two following statements show the quantities of the different kinds of timber brought down past each station, and the cubical contents and amounts received on the timber per ton by payment of tolls. This value appears to be reasonable as compared with selling prices already given, and should leave a very fair margin of profit to the wood-cutters after paying all expenses.

FOREST DEPARTMENT, BENGAL.

CHITTAGONG DIVISION.

Statement of Timber brought down from the Chittagong Forest during the year 1871-72.

Name of River or Division.	Description of Timber.	Pieces.	Cubic feet.	Totals of each River.	
				Pieces.	Cubic feet.
Kurnafoolee	Jarool	181	4,857 0 9		
Ditto	Gamar	260	3,300 9 9		
Ditto	Champlis	28	1,198 7 6		
Ditto	Kandel	38	793 1 9		
Ditto	Chekarossee	2	16 5 6		
Ditto	Boelsur	2	14 4 6		
Ditto	Thalee	170	3,056 2 6		
Ditto	Pitraj	8	413 6 9		
Ditto	Gurjun	33	4,382 3 0		
Ditto	Hurritokey	1	30 0 0		
Ditto	Toon (Soorujbeth)	6	53 2 6		
Ditto	Oorium	42	1,402 10 9		
Ditto	Vadee	53	488 4 0		
Ditto	Koroe	3	112 3 6		
Ditto	Bohul	7	130 8 9		
Ditto	Vooga	5	182 0 0		
Ditto	Chakooa	8	159 9 0		
Ditto	Bunduloohee	13	78 6 0	860	20,769′ 2″ 6‴
Sungoo	Jarool	14	477 11 0		
Ditto	Champlis	3	70 8 1		
Ditto	Thalee	1	32 0 0		
Ditto	Vadee	2	30 6 0		
Ditto	Bunduloohee	1	46 10 6	21	657 11 17
Mamoree	Jarool	2	7 0 0	2	7 0 0
Bagkhalee...	Kandel	6	175 0 0		
Ditto	Tohungree	26	32 8 0	32	207 8 0
Hulda	Gurgun log	1	14 2 8	1	14 2 8
				916	21,656 0 9

H. H. DAVIS,
Asst. Consr. of Forests, Chittagong Division.

FOREST DEPARTMENT, BENGAL.

Chittagong Division.

Statement showing the amount realized on account of the different classes of Timber sold during 1871-72.

Division.	Number of logs sold.	Cubical contents.	Amount realized and due on account of timber sold.	Average amount per log.	Average cubical contents of log.	Average amount per ton of 50 cubic feet.	Remarks.
Kurnafool c	860	20,769′ 2″ 6‴	3,264 7 3	3 12 9	24′ 1″ 9‴	7 9 9	Timber sold in previous years remaining unmoved at the commencement of the year.
Sungoo	21	657 11 7	114 12 3	5 7 5	31 3 8	8 3 3	
Mamoree	2	7 0 0	1 5 0	0 10 6	3 6 0	9 6 0	Timber remaining unmoved at the close of the year.
Bagkhalee	32	207 8 0	57 6 6	1 2 8¼	6 5 10½	8 13 0	Balance removed from depôts by purchasers during the year.
Hulda	1	14 2 8	2 0 0	2 0 0	14 2 8	7 0 0	
Total ...	916	21,656 0 9	3,419 15 0	.....	.....	.....	

H. H. Davis,
Asst. Consr. of Forests, Chittagong Division.

Dacca.

105. The Scaltek Ghât at Cachar, where an immense quantity of forest produce is stopped, and where a toll is collected, has this year produced Rs. 11,469. It is in charge of the Deputy Commissioner. No reliable statistics of the quantity of produce passing down the river can be given. Proposals were lately made to place it in charge of a forest officer, but the plan did not commend itself to Government for sanction.

Collections by civil officers.

106. These collections are made upon licenses to cut timber, licenses to catch elephants, licenses to collect general forest produce, and sale of India-rubber Mehals.

107. These collections amounted during the year under review to Rs. 60,529, as per statement given in section V, Financial. It will be seen that the collections for sale of timber and licenses to cut amount to only Rs. 4,013 in 1870-71, and Rs. 1,855-8 in 1871-72. As in Assam alone very large quantities of timber; as also boats, are taken out of the forests every year and taken down the river for sale, it is quite clear that only a very small portion of the revenue which should be collected is paid to the Government treasury, and that timber taken by the Public Works Department and for other Government purposes is not shown at all.

108. It is certain that revenue collections on forest produce generally are capable of being very largely increased if they are properly looked after, and increased revenue on the produce need not be any extra tax on the district inhabitants, as the collection of produce for domestic purposes free is generally conceded.

109. The use of forest produce by inhabitants living in or near the forests for their own domestic use is a question, however, which should probably be decided authoritatively by Government. It seems hard that such inhabitants should be made to pay for such produce as they require; at the same time in the aggregate the amounts which might be collected from villagers for the right of collecting what they require from Government land would be considerable, and were it ever so small, would establish a control and prevent encroachment and waste and the establishing of rights in forests which hereafter may be difficult to get rid of when the forests are much more valuable.

110. It will probably be advisable to adopt before long some regular system of management in forests which are in charge of the civil authorities. Indeed, this is provided for in the proposed new Forest Bill, and has in some measure been introduced in the Central Provinces. In Assam some measure of this kind would be very advantageous, and is indeed absolutely necessary if every 100 acres of tea require 300 acres of forests to make into charcoal for manufacture. This subject has received attention, and will be discussed with the Commissioner on the first opportunity.

SECTION V.

FINANCIAL.

111. The following statement gives the financial results of the year:—

	Rs.
Receipts—	
Collections by the Forest Department were	78,560
By civil officers	60,529
Total ...	1,39,089
Deduct—	
Charges of the Department	1,08,339
	30,750
Add—	
Difference between assets and liabilities	679
Total surplus ...	31,429

112. The Forest Department alone, with its heavy expenditure on fiscally unremunerative establishment, shows a cash deficit of Rs. 29,779.

113. The total revenue received from the forests, however, exclusive of rent of Soom forests, shows a yearly surplus of revenue over expenditure, and this revenue should gradually increase considerably, while expenditure should gradually decrease.

Purchase of elephants.

114. The Government of India, in letter No. 14F, dated 16th January 1871, sanctioned the purchase of 8 more elephants; of these 4 were purchased during 1871-72. The department previously owned 5, so that it had at the end of the year 9 elephants, viz.—

2 Cooch Behar,
2 Bhaugulpore,
4 Assam,
1 Dacca,

leaving four still to purchase.

It is impossible to get over the country without elephants, and each officer should have two in his charge to enable him to go into the district with any degree of comfort consistent with health. He has not only his own tent and baggage to take with him, but that of his servants and other attendants, besides considerable stores of rice for both man and beast, as it is not readily procurable in the forest districts.

115. The Conservator requires four, as he has a clerk, extra tents, and records, to take with him, and he is at a great distance from his head-quarters, and must take considerable supplies with him.

Tents provided for all officers.

116. Each officer has now been provided with a tent, thus expenditure under these heads will in future be much less.

General remarks.

117. It seems advisable, whilst treating the receipts and expenditure of the Forest Department separately, also to show forest revenue received from all sources in order that Government may see what their forest property brings in yearly and watch all its fluctuations. At present there is still a considerable item of revenue which is clearly forest revenue, but is not shown under this head.

Soom forests.

118. The collections for lease of Soom forests in Assam for silk-worm feeding is here referred to. At present they are shown under "land revenue," which seems scarcely correct.

119. The Deputy Commissioners have furnished the following information regarding the leasing of the Soom forests.

Durrung.

120. The area leased during the past year was 1,095*b*. 4*c*. 13*h*. at the rate of 8 annas per beegah as Furringhutter land; the amount received was Rs. 548. There are about 600 beegahs of Soom forests besides in the district unlet.

Sibsaugor.

The area of Soom forests let out in 1871-72 was 45,774 beegahs, in which Rs. 22,872 was collected, ten acres being at Re. 1 per acre and the rest at 8 annas per acre.

There are other Soom forests besides these in the districts, but the extent is not known.

Kamroop.

In this district 5,178 beegahs of Soom were let for Rs. 2,316; this is at the rate of 8 annas per beegah for kheraj lands, and 4 annas per beegah for lakheraj lands. There is scattered Soom in different parts of the district besides what is leased.

Nowgong.

There are no Soom forest tracts in this district. Soom trees are generally grown within the ryots' holdings, and the plots of land on which they are grown are assessed as Furringhutter at 8 annas per beegah, or bustuar at Re. 1 per beegah. They are not separately settled.

Luckimpore.

No return received.

Total area leased.

The total area leased during the year was 52,047 beegahs, and the amount received was Rs. 25,736.

121. There is much more Soom forests in Assam than is used for the purpose of silk-worm feeding; and possibly after receipt of the provincial report expected on silk produce and manufacture, it may be possible to do some thing to stimulate the produce by facilitating the purchase and distribution of silk-worms' eggs in the district.

Statement of collections by civil officers.

122. The collections on forest produce made by civil officers are shown under the different heads in the statement which follows.

FOREST DEPARTMENT, BENGAL.

Statement showing Forest Revenue collected by Civil Officers in the Lower Provinces of Bengal during the official year 1871-72, *compiled from the return submitted by the Accountant-General, Bengal.*

Districts.	April 1871.	May 1871.	June 1871.	July 1871.	August 1871.	September 1871.	October 1871.	November 1871.	December 1871.	January 1872.	February 1872.	March 1872.	Total.
Cooch Behar Division.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Garo Hills	20 0 0	200 0 0	.....	.....	140 0 0	120 0 0	.....	.....	735 10 9	.....	1,131 8 0	6 0 0	2,353 2 9
Gowalparah	40 0 0	80 0 0	187 8 0	.....	425 0 0	.....	.....	70 0 0	236 8 0	180 0 0	.....	100 0 0	1,319 0 0
Julpigoree	.....	.....	.....	.....	.....	.....	.....	.....	.....	287 0 0	.....	.....	287 0 0
Total ...	60 0 0	280 0 0	187 8 0	.....	565 0 0	120 0 0	.....	70 0 0	972 2 9	467 0 0	1,131 8 0	106 0 0	3,959 2 9
Assam Division.													
Khasi and Jyntea Hills	258 0 0	.....	.....	.....	.....	.....	1,385 0 0	10 4 0	.....	.....	.....	433 0 0	2,086 12 0
Durrung	124 8 0	32 10 0	61 0 0	40 8 0	10 6 0	.....	68 4 0	8,570 8 0	229 8 0	40 8 0	5,798 4 0	7 0 0	14,983 0 0
Kamroop...	.....	3 8 0	.....	20 0 0	60 0 0	.....	.....	332 8 0	.....	.....	.....	.....	416 0 0
Luckimpore...	128 9 4	.....	.....	.....	.....	.....	.....	4 0 0	4,015 8 0	5,000 0 0	.....	9,000 0 0	18,148 1 4
Naga Hills	140 0 0	140 0 0	40 0 0	.....	.....	.....	525 0 0	545 0 0	100 0 0	60 0 0	60 0 0	.. ...	1,610 0 0
Nowgong...	160 0 0	60 0 0	20 0 0	20 0 0	20 0 0	.....	.....	20 0 0	141 0 0	40 0 0	25 0 0	67 0 0	573 0 0
Sibsaugor	.....	40 0 0	.....	.....	.....	.....	.....	250 0 0	50 0 0	.....	4 8 0	47 0 0	391 8 0
Total ...	811 1 4	276 2 0	121 0 0	80 8 0	90 6 0	.....	1,978 12 0	9,732 4 0	4,536 0 0	5,140 8 0	5,887 12 0	9,554 0 0	38,208 5 4
Bhaugulpore Division.													
Godda	.....	.....	.....	2 0 0	2 0 0	.....	.....	0 8 0	1 8 0	.....	2 8 0	11 4 0	19 12 0
Rajmehal	.....	.....	.....	.....	.....	300 0 0	.....	.....	6 8 0	.....	1 0 0	.....	307 8 0
Total ...	... ..	.....	.....	2 0 0	2 0 0	300 0 0	.....	0 8 0	8 0 0	.....	3 8 0	11 4 0	327 4 0
Chittagong Division.													
Chittagong	3,237 0 0	.....	345 0 0	647 4 0	537 10 0	150 0 0	.....	.....	37 5 3	.....	.....	920 0 0	5,874 3 3
Dacca Division.													
Dacca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71 0 0	.....	71 0 0
Backergunge	.....	.....	620 0 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	620 0 0
Cachar	.....	269 0 0	514 6 0	221 2 6	1,479 2 6	501 10 1	1,531 14 9	3,355 2 6	1,611 8 3	1,845 6 0	105 0 0	34 11 9	11,469 0 4
Total ...	.....	269 0 0	1,134 6 0	221 2 6	1,479 2 6	501 10 1	1,531 14 9	3,355 2 6	1,611 8 3	1,845 6 0	176 0 0	34 11 9	12,160 0 0
Grand Total ...	4,108 1 4	825 2 0	1,787 14 0	950 14 6	2,674 2 6	1,071 10 1	3,510 10 9	13,157 14 6	7,165 0 3	7,452 14 0	7,198 12 0	10,625 15 9	60,528 15 8

N.B.—Next year it will be possible to show the amount collected under the different heads of collections, as returns are now being furnished.

123. Regular quarterly returns are now furnished to the Forest Office of the collections in the different districts.

General remarks.

124. Timber operations being very limited and likely to be so for some time, the forest officers might be utilized in the districts to a large extent, and very profitably, in going about to see how the revenue from forest produce is collected, and how this revenue might be improved; they would be able to check malpractices of all kinds, and prevent jhooming in rich forest tracts which should be protected.

125. All this cannot be looked after by the civil officers, whose whole time is taken up by multitudinous duties, and who cannot therefore go into forest districts to examine what is being done by their subordinates.

126. The plan introduced this year by the Government of Bengal, of placing the local forest officers in Assam under the Commissioner of the division, is an excellent one for these purposes, and might perhaps with advantage be extended.

127. The forest revenue would probably soon show considerable increase, as the forest officer would have an interest in it, as being connected with it, which they are not now, and they would be usefully employed during a portion of the year when, without timber operations to look after, they have not much to do. The Commissioner could easily keep them under control and make use of them in various local matters of inquiry much more effectively than the Conservator at such a distance can do, and they would gradually become intimately acquainted with all parts of the forests.

128. A further application of this system will, it is hoped, be possible.

SECTION IV.

General.

Remarks on progress and causes which tend to retard it.

129. The previous Sections of this report have given in detail the work which has been done during the year in each division; it is with much regret that so little apparent progress is recorded. This slow progress is a source of constant anxiety to the Conservator, but the growth of forest administration is to a certain degree necessarily slow; and apart from this, there are other causes which in the Lower Provinces just now are not calculated to accelerate motion. Some of the causes may be thus referred to.

130. First, as regards experienced officers. It is evidently difficult to find such men to fill important posts, and apparently it has been impossible to send any to Lower Bengal; but much which might and should be done has to lie in abeyance until experienced officers have been obtained.

131. The divisions here are very large and at great distances from any centre; thus it becomes more necessary here, as has been before stated, to have experienced men in charge, who, having once received instructions for work, can carry out the necessary steps and go on somewhat independently and without reference regarding every little detail to the Conservator, who may be a fifteen days' dâk or more distant.

132. The immense extent of the territories to be traversed, and the tardy communication by post, tend to create delays and defeat the most anxious desire for quicker progress. Looking, however, to other provinces, and the advances made in them since the introduction of forest conservancy, perhaps after all it will be found that these provinces are not far behind.

133. Again, if timber were plentiful in the forests and readily saleable in the markets, all would go on briskly, and there would be no *apparent* want of

progress; the officers would all be fully occupied, there would be much work to show in return for their pay, and some net revenue to pour into the local treasuries in return for expenditure. The want of experience in officers would be less felt, and work only requiring care and general intelligence might be entrusted to them. But such is not the case. Markets are all supplied more cheaply from Nepal and by sea than can be done from the Government forests. Moving timber from British forests is very costly, and also accompanied with many risks of loss. Thus only experimental and limited operations can be opened out with advantage.

Preparation of working plans for "Reserves."

134. It was remarked in the resolution on the report last year, 1870-71, that little had been done towards bringing the "Reserves" into working order. By this probably the preparation of "working plans" for the Reserves is referred to, and some remarks on the subject appear necessary. The fact is that as regard the Sikkim Reserves they require at present no working plans; they simply require rest and protection for some years, and only such timber should be taken from them as is absolutely wanted for some local purpose,—even this had better be purchased from private forests if available. While we work and sleep, timber is steadily growing, and the bare protection of the forests from plunder and waste is of itself the first, and a very important step in forest conservancy. In Bhútan there is still a considerable stock of timber which may be felled without injury to the forest, but this stock will have to last us for several years, and we need be in no hurry to fell it. It is proposed, in deference to the wish that seems to exist, to begin next season the preliminary work of surveying and valuing reserves required before preparing a working plan for each. This work has not been possible hitherto. It is a work of time, and must not be hurried if it is to be of any value. There is a great deal to do, as may be seen from a memorandum lately submitted to Government on the subject, before this work can be carefully carried out, and there should be some skilled officer in charge of the work; but up to the present time there is not a single officer who knows anything at all of the subject in charge of a division, and the promised deputies, even though gazetted, have not made their appearance.

135. It may here be remarked that the preparation of working plans for Reserves will be expensive and tedious, and that keeping the jungle fires out of the forests, and generally thinning and clearing them, are vastly more important operations. This theory about working plans and all connected with it, how well soever it may be adapted to European forests, is not suited for the present state generally of the Indian forests, and can only be partially carried out owing to their nature and situation.

Difficulties in the way of applying the system of working plans.

136. It is unnecessary here to describe forests in detail. The difficulty of counting and measuring trees in grass which an elephant can only just push through, and which the rider can only just see over, can only be judged of by those who try it: add to this extensive swamps and large open spaces almost destitute of trees, and it will be easily imagined that the accuracy of results arrived at will be in very limited proportion to the time and money which will be spent in surveying and valuing. The time spent for many years to come in such work is time during which the bulk of the forests is being neglected, or rather given over to destruction and heavy loss and injury, during which they might have been improved by thining, clearing, and marking off the timber to be felled, &c. Under these latter operations their extent and value would become generally known, and preparation made for the application of more scientific operations or system to follow. The establishments at present are totally inadequate to as much field work during the short season which is available for such work, and the absence of timber for markets and consequent revenue renders Government unwilling to grant more officers; as in the Lower Provinces

for instance, there is already a heavy expenditure for establishment and very little return. However, this is inevitable, as the department has only been appointed to watch after the timber has been stolen, and the means given for protection of the forests and the improvement of the timber which is growing in them must be adequate to the work, or forest conservancy is a mere name and reports delusive. Progress is admittedly slow, but under present circumstances it cannot be otherwise. The Forest Department is in the unfortunate position of being expected to make bricks without straw. Before commencing operations or working plans we should first deal with the jungle fires. To stop these is no easy matter, but it lies at the root of forest conservancy in tropical climates. This great evil does not exist in European climates, and having a forest and plenty of skilled workmen, a proprietor may at once set to work and draw out a working plan. It is his first and most interesting work to find out what his property is worth and likely to produce yearly; but in India, before entering on this, our first care should be to arrest destruction and waste, which is of two kinds:

(1.) Plunder and destruction by men.

(2.) Injury and destruction from what may be called, for the sake of distinction, natural causes, *i.e.*, jungle fires.

The first stage is not difficult to compass, and is merely a matter of establishment and proper measures of superintendence, but the latter is a very difficult one to deal with owing to the facility with which a fire may be commenced, and the difficulty which exists in finding out the originator, and even when found, of punishing him. Besides this a certain portion of revenue collected by civil officers for grazing will have to be sacrificed, and these officers will not readily consent to this or approve of a plan for putting a stop to jungle fires, as it would interfere with the occupations and industry of many of the inhabitants. One Commissioner has placed it on record that *jungle fires are actually a benefit to forests, because they kill insects*, which may serve as an illustration of the views held on the subject.

Importance of arresting destruction arising from jungle fires.

137. The prevention of jungle fires lies, as before said, at the root of the preservation and improvement of our natural forests, and indeed of their very existence. It is the most important subject we have to deal with, and should take precedence of all other matters. A letter was addressed to the Superintendent, Botanical Gardens, a short time ago for his views, as he is not only a botanist, but has also been a forest officer, and can speak from experience as to injury done to the forests, and the subject will immediately, on receiving his reply, be taken up with a view to having some regular plan proposed to Commissioners for their consideration.

138. This subject seems really of such importance, that it is suggested and urged that the opinions of civil officers from their point of view, and the opinions of forest officers all over India, be collected as to the destruction caused by fires and the means which have been taken, or could be taken, best suited to put a stop to them. In Cooch Behar at least the evil is undoubted, and the remedy rests with the civil district officers assisted by suggestions from forest officers.

Separate establishment for preparation of working plans necessary.

139. If Government decided that regular work on the Reserves for the preparation of working plans shall commence at once, a special establishment should be appointed for the purpose quite irrespective of the general forest establishment. Such an establishment might commence operations in Assam after the selected Reserves have been approved by the Commissioner, or in Bhútan in the Moraghat forests, a splendid and compact Sâl tract.

140. Since writing this, a letter has been received from the Superintendent, Botanical Gardens, in reply to the one addressed to him on the subject of jungle fires, to which I would draw particular attention. These letters are given below to speak for themselves, and it is hoped that some practical plan will come out of the references made to the Commissioners of Cooch Behar and Assam on the subject

Correspondence on the subject of effects of the jungle fires.

No. 19, dated Calcutta, the 27th May 1872.

From—H. LEEDS, Esq., Conservator of Forests, Bengal.

To—The Superintendent, Royal Botanical Gardens.

I HAVE just come across a paragraph in a letter from the Commissioner, Cooch Behar, to Government of Bengal, which has somewhat surprised me, and of which I attach copy to ask you your opinion on the matter.

2. I believe there is no doubt that the annual fires do good so far as killing many insects goes which are injurious to timber, and that they once a year at least thoroughly ventilate the forests and purge them of unhealthy vapours; but these advantages are nothing in my opinion to the destruction committed by fire in Sâl forests, nor can I think that the Commissioner can have understood Dr. Anderson's meaning in regard to it. If the jungles fires did not yearly destroy the young seedlings, they would in most places spring up so thickly as to kill the grass, and by natural process keep out the fires. I have myself seen large tracts of Sâl forests in the Dooars, where the trees appear to be entirely arrested in their growth from the effects of jungle fires, as the fires go through the tracts just at the time the young leaves and shoots are bursting forth, where there is not a single tree with a branch or head to it, where the pole-like boles are knotted at every joint owing to continual destruction of the leaves and young branches, which would but for the fires follow the course of nature; in fact, tracts where there is not a single healthy tree to be seen, and where evidently the forest is not growing. I cannot attribute this to anything but the effects of the jungle fires. I refer especially here to a tract in Ramshi Hât across the Teesta and about 15 miles from Julpigori, where large herds of buffaloes are kept, and whence a considerable quantity of "ghee" is exported. The question is one of much importance, and I should be glad to have your opinion.

Extract from a letter from the Commissioner of the Cooch Behar division to the Under-Secretary to the Government of Bengal,—(No. 174, *dated Julpigori, the* 19*th January* 1871.*)*

[*Subject.*—NEW FOREST RULES.]

Para. 10.—Section 58 will not apply to the Dooars of Bhútan, as there are no communities who have forest rights; but if it did, it would render it imposible for the people to exist. It is the practice to burn the grass in and around the forests every year. This practice, which would be utterly destructive of pine forests, is universally believed by natives to be necessary to the health of Sâl forests. The late Dr Anderson when Conservator of Forests rejected the idea of the possibility of fire benefiting the forests; but two years or more ago he informed me that he had found it to be the fact, and explained the cause. He said the annual fires kill the insects and do for the forests what we are obliged to have done by manual labor in the Botanical Gardens. The first shoots of the Sâl, like those of many other trees, are commonly too vigorous for their roots; the annual fires for three or four years burn down the shoot, but by the fifth year it has acquired sufficient vigour at root to enable it to rise above the fire and it takes no damage. The fires thereafter continue annually to scorch the lowest branches and thus allow the stem to grow. Dr. Anderson intimated to me his intention of publishing a paper on the subject, which I would recommend for inquiry before what appears to be a useless piece of cruelty is inflicted on the people.

No. 7 (Plantations), dated Royal Botanical Gardens, 29th June 1872.

From—George King, Esq., M.B., Superintendent, Botanical Gardens, Calcutta.

To—H. Leeds, Esq., Conservator of Forests, Bengal.

I have the honor to acknowledge the receipt of your letter No. 19, dated 27th ultimo, together with its enclosure. In reply I beg to state it is my opinion, formed after careful personal observation and inquiry on the Sâl forests of Kumaon, Gurhwal, and Dehra Dhoon, that the annual recurrence of forest fires is by far the most serious difficulty with which the Forest Department has to contend. These fires at present annually cause to the forests above mentioned an amount of damage which is simply incalculable.

2. The only Sâl trees to which fire I believe does positively no harm are those with stems of considerable girth, but seedlings, saplings, and young trees, even of the girth of a man's thigh, all suffer very much; indeed, so serious is the damage that in my opinion the majority of the young Sâl trees in those forests will never form good timber, and consequently the day is not very far off when there will be an utter dearth of this most valuable wood, unless new and more rigid fire conservancy arrangements are sanctioned.

3. As regards the opinion expressed by the late Dr. Anderson, that the annual fires kill insects that might be destructive, I would merely say that although I have most carefully looked for such, I never have been able to discover any insect that does any damage to healthy living Sâl. I have however not unfrequently seen unhealthy young Sâl trees (the bark of which had been charred by repeated forest fires) suffering from what appeared to be the ravages of an insect; and felled Sâl timber, *if allowed to lie unbarked*, is speedily attacked by a borer, but if barked immediately after felling, enjoys perfect immunity.

4. I quite admit that it is a common notion held very strongly by all natives interested in grazing, that the annual fires are good for Sâl trees of all ages. These fires are speedily followed by a crop of tender green grass, which yields capital grazing for their cattle, and as a fact forest fires are usually raised by graziers. The opinion of such people as to the effect of fire on Sâl forests in which they have little or no interest is, I fear, influenced by its good effect on grazing grass, in which they have a great interest, and is, I think, unworthy of serious attention.

5. It is not at all in accordance with my experience that young Sâl trees, of which shoots are burnt down year after year by forest fires, ultimately become so vigorous as to throw up in a single season shoots tall enough to be beyond the reach of harm from fire. My experience, on the contrary, is that when once by loss of shade a piece of Sâl forest has become open enough to admit of the growth of grass (which as sure as it grows is annually burnt), the doom of all the Sâl seedlings and saplings in that piece of forest is from that time fixed, and all hope of its ever producing timber is gone unless fire can be excluded. The tender shoots thrown up by the seedlings or saplings during the rains are regularly burnt during the succeeding cold weather. The plants as a rule begin after a year or two to throw up several shoots instead of a single one, and so dissipate their strength; these shoots go on being annually burnt, and finally the plants die. I could show you many square miles in the Sâl forests of the North-Western Provinces where these miserable results are too plainly demonstrated, and I cannot express too strongly my conviction that forest fires and the growth of Sâl are incompatible, and that next to fires, buffaloes and goats are the greatest enemies to young Sâl forests.

Exhaustion of American forests.

141. As an appendix, a translation from the "*Revue des Eaux et Forêts*" is given, which will be found of some interest as regards supplies of timber from America. It is probably not generally known that waste and steady destruction of forests, hitherto considered inexhaustible in those vast regions, have brought them to the verge of ruin in some parts, whilst in others they have entirely disappeared.

Imports of timber by sea to Calcutta.

142. A statement of value of timber imported by sea to Calcutta, prepared by the Collector of Customs, which is attached, curiously enough bears out the statements of the writer in the French article, for it will be observed that America, with the exception of some Mahogany, has during the past few years brought nothing to Calcutta, though previous to 1867 considerable supplies were entered at this port.

Protection of all existing forests necessary.

143. All tends to show that the greatest care should be taken of all forests now existing, and that protection should be spread as a shield, not only over reserved forests. Colonel Money, in his prize essay on tea cultivation, estimates that 300 acres of wood are required for every 100 acres of tea.

144. If this be so, and there is no doubt that the estimate is correct, the care and management of the unreserved forests in Assam, which ranks first as a tea country, require a steady care and management. It has before been observed that to the hill tribes jhooming is a necessity, and probably all that should be done as regards these tribes is to prevent their clearing the crowns of the hills; but the wandering classes of cultivators *in the plains* should be restricted in every district. Perhaps the best step as a first check, and in order to bring them under some control, would be to disallow jhooming, except by permission of civil officers, in certain areas, to be determined on and set apart by them. All low-lying lands, for instance, are available as unfit for tea but good for paddy, and there is plenty of grass land also available for crops of all kinds, but let forests and wood be protected.

Measurement of trees for record of yearly growth.

145. In 1868 the girth measurement of 50 trees in three different tracts of Sâl forests in the Terai were taken at one foot, three feet, and five feet from the ground. One tract was on the hills, another in the plains in an uncleared and dense forest, and the third in a patch cleared and thinned for the purpose, so as to observe any variety of growth which might be attributed to the varied conditions of the tracts. The trees were measured again in 1869, and have this year been measured a third time. There is a general increase of a few inches in all the measurements, but the results are scarcely worth printing in this report. The register will be kept up, and the trees examined every year to see that the numbers on them for identification are kept in order.

Present position of the Forest Department in Lower Provinces, Bengal.

146. In conclusion, reviewing the position of the department at the close of the year, it may be represented as having arrived at a stage when questions and proposals of all kinds are being considered previous to adoption of some settled plan suited to the various conditions of each division. But satisfactory progress cannot be expected over this vast extent of country unless the Conservator is supported by able dignities at the head of divisions, whom he can trust to take an intelligent view of, and carry out with some self-reliance the instructions they receive, besides assisting him with local knowledge and information, the result of experience and observation.

Forest rules.

147. Forest rules suited to the requirements of these provinces have been sanctioned and published, and though they have not yet been extended to any division, they are in force under Part I, Rule I, in all gazetted Government forests or reserves.

Visit of Inspector-General desirable.

148. A visit from the Inspector-General was much desired by the Conservator, as it would have given him some support, and he regrets very much that it was not found possible to accede to his wishes regarding a local conference on forest matters in the Lower Provinces.

APPENDIX A.

Statement showing the Private Forests in the Bhaugulpore Division.

Name of District.	Name of Forest.	Area.	Boundary of Forest.	Name and residence of proprietors.	Remarks.
Bhaugulpore ...	Munecharee ...	8 sq. miles.	South-east of Colgong, within the Sonthal Pergunnahs.	Baboo Girender Chunder Ghose, Calcutta.	
	Mudhoobun ...	4 „ „	South of Peerpointee ...	Beebee Peary Bagum, Bhaugulpore.	
	Luchmeepore ...	15 „ „	Banka sub-division ...	Takooranee Moheenee Koomaree, Luchmeepore.	
	Khurruckpore ...	20 „ „	Near Jamalpore Railway station.	Minor Maharajah of Dhurbhanga under the Court of Wards.	
	Suhroee (Kajbee) ...	20 „ „	Banka sub-division ...	Rajah Lulamud Sing, Purneah.	
	Thala Gurreah ...	2,000 beegahs.	Soopool ditto ...	Baboo Nund Lall Singh and others, Sookpore.	
	Talooka Bhugwanpore ...	4,000 „	Muddheepoora sub-division.	Bode Narain Singh, Juddea.	
	Sreepore ...	3,000 „	Ditto ditto ...	Kanhya Mundur and others, Ramputty.	
	Bishenpore ...	1,800 „	Ditto ditto ...	Mussamut Kallabutty.	
	Gorha Jhurkaha ...	7,000 „	Ditto ditto ...	Baboo Nitressur Singh, Dhurbhanga.	
	Cheelownee ...	2,000 „	Pergunnah Harawut, Soopool sub-division.	Muddun Lall Doss of Rajgunge.	
	Kaup ...	500 „	Mudhopoora sub-division	Baboo Hurbullub Narain of Sunbursa.	
	Kankur ...	1,000 „	Ditto ditto ...	Mohunt Mungul Doss of Chuckla, Pergunnah Dharmpore, Purneah.	
Monghyr	Bhimband ...	Unknown ...	Unknown; the forest is spread over the range of hills mentioned in column I.	Rajah of Dhurbhanga, lives at Dhurbhanga in district Tirhoot.	The forest has been let in ticca for a number of years to Mr. H. Dear of Monghyr. He states as follows:— "It is a forest which under strict conservancy might become very valuable. There is a very large amount of young Sál trees in it, but what there is of old Sál is in inaccessible places; other trees of less valuable timber are also plentiful."
Sonthal Pergunnahs ...	Nil ...	Nil ...	Nil ...	Nil.	
Purneah	„ ...	„ ...	„ ...	„	
Gya	„ ...	„ ...	„ ...	„	
Patna	„ ...	„ ...	„ ...	„	
Chumparun	Treebanee ...	427 sq. miles.	West by the Gunduck; East Nepal Frontier; North ditto.	Rajah of Bettiah and Ramnuggur.	Great quantities of best timber cut away, but still much remaining, such as Sokooa, Sisoo, Toon, Khurwa, &c.
	Seetamaree ...				
	Goburdhuna ...				
Lohardugga	No information obtainable.				
Singbhoom ...	Kurelia ...	440 sq. miles.	Approximate. Specified boundaries cannot be given; it may be said generally that the forests are bounded by the cultivated lands of pergunnahs in which they are situated.	At present Government ...	It is in Porhat, and is at present under sequestration.
	Looda ...	160 „ „		Ditto ditto ...	Ditto ditto.
	Chyetunpore ...	48 „ „		Thakoor Roghoonauth Singh of Khursowa.	
	Lolaghur ...	48 „ „		Minor Ram Chunder Dhol of Ghatsela in Dhalbhoom.	The estate is in the Court of Wards.
	Rowla ...	48 „ „			
	Pathurghara ...	16 „ „			
	Bankai ...	6 „ „			
Maunbhoom	Rakha ...	.....		Nilmoney Singh Deo ...	Contains mostly nothing but young trees.
	Kenda to Mudhoobun Hoora.	160 sq. miles.		Rajah of Pachet Kassipore.	
	Hoora to Allyhara ...	150 „ „		Ditto ditto ...	Ditto ditto.
	Shamnaggur Pyrachali ...	96 „ „		Mukund Narain Deo ...	Ditto ditto.
	Dhanara to Umbikanugger	64 „ „		Manhazur Deo ...	Ditto ditto.
	Umbikanugger to Raipoor Shamsoonderpoor.	96 „ „		The zemindar of those pergunnahs.	Ditto ditto.
	Mudunnia to Raipoor ...	36 „ „		Ditto ditto ...	Ditto ditto.
	Koylapal ...	50 „ „		The zemindar of Simlapal ...	Has some full grown trees.
	Barabhoom Dhadika to Palkilia.	24 „ „		Ghatwal and zemindar of Dhadka.	Ditto ditto.
	A tract of jungle running from Chilla to the western end of Dobsa.	512 „ „		Ditto ditto ...	Ditto ditto.
	Patkoor ...	...		Zemindar of Patkoor ...	A good number of full sized trees still standing.
	Marajhang in Patkoor ...	120 sq. miles.			
	Phulkusma	12 „ „		Ditto of Phulkusma ...	Contains only young trees.
	Bagmoondee Ajoodhya Hill	270 „ „		Ditto of Bagmoondee ...	Some old trees standing, but in almost inaccessible sites

(Sd.) C. W. Losack, *Capt.*,
Offg. Dy. Conservator of Forests.

APPENDIX B.

Statement concerning Stick-lac.

Questions.	Bhaugulpore.		Sonthal Pergunnahs.		Patna Commissioner.			Chota Nagpore Commissioner.				
	Bhaugulpore.	Monghyr.	Rajmehal.	Deoghur.	Patna.	Gya.	Shahabad.	Hazareebaugh.	Lohardugga (Chota Nagpore proper).	Palamow.	Maunbhoom.	Singbhoom.
1. Where collected	Collected in Banka sub-division.	Collected ...	Collected ...	Collected (south of district).	Collected ...	Collected (south and west).	Collected (Saseram sub-division).	Collected (south and west of district).	Collected ...	Collected ...	Collected ...	Collected.
2. Quantity ...	220 mds. ...	5 or 6 mds. ...	Very trifling (not stated).	90 to 100 mds.	100 mds. ...	Not stated ...	30 mds. ...	Not known ...	20,000 mds. ...	3,000 mds. ...	12,000 mds. ...	3,000 mds.
3. If any revenue collected.	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee ...	No fee.
4. How produced...	Artificially ...	Not artificially...	Artificially ...	Artificially ...	Artificially ...	Artificially ...	Not artificially ...	Artificially ...	Artificially ...	Artificially ...	Artificially ...	Artificially.
5. How prepared and converted.	Made into sticks and bracelets.	Bangles, bookas, and dyes.	Not prepared..	Not prepared..	Prepared ...	Not prepared as a rule.	Bracelets and dyes	No ...	Not made, except into stick lac and lac-dye for market.	Not prepared; sold as stick-lac.	Inkstands, bangles, sealing wax, and lac-dye.	Not prepared.
6. Where sold ...	Banka, Jeypore, Jumdaha, Luchmeepore, Katooreeah, and Chundun.	Chuckye.* Khurruckpore.	Godagunge ...	By private sales	Patna and Futwa.	Emamgunge, and taken to Mirzapore.	Sent to Mirzapore, Benares, by local banians, who buy in small quantity in almost every bazaar.	Chuttra ...	At most markets (hauts).	At Gurwilia Naggor, Latibar, but mostly by private sale to exporters. Large quantity of lac yearly imported from Sirgooja and other neighbouring Tributary Mehals.	Godda, Maunbhoom, Rajmoondee, Nagra, Keeary, Purulia, and Matha, &c., &c.	Bancoorah, Majgaon, and Sonamooki.
		* Rs. 6-8 per md.										
7. Value in district	From Rs. 8 to Rs. 10 per maund.	Rs. 16 per md. ...	Rs. 10 per md.	Rs. 7 to Rs. 9 per md.	Rs. 6 per md.	Rs. 2 to Rs. 20 per md.	Rs. 12 per md. ...	Rs. 10 per md.	Rs. 7 to Rs. 27 per md.	Rs. 6-4 to Rs. 17-8 per md.	Rs. 16 to Rs. 17 per md.	1st quality Rs. 10 to Rs. 16 per md; 2nd quality Rs. 8 to Rs. 14 per md.

(Sd.) C. W. Losack, *Captain,*

Offg. Depy. Conservator of Forests, Bhaugulpore Division.

APPENDIX C.

Extract from Report on the Forests in the Sylhet District, Dacca Division.

Introductory.

1. WORK was commenced to the south-east somewhat late, and (the tour being one of exploration in a district where the people are anything but obliging, and the undersigned being accompanied by men who were total strangers to what was required,) progressed rather slowly.

Valuable and useful trees in the district.

2. The trees that are considered of any value for boat-building or domestic purposes are—

Jarul.	Hundi.	Nurcha.	Ping.
Nagussur.	Kaimulah.	Murcha.	Jam.
Kurtah.	Poma.	Hortaki.	Mohal.
Adhal.	Ratah.	Gamair.	Sintajadh.
Singra.	Jinari	Moroi.	Harish.
Cham.	Jhalnah.	Chamiah.	Boroi.
Jahke.	Kalakura.	Kakra.	Pooair.

It is unfortunate that there is but one forest tract (that to the east of the Haraguj Hills) in which Government has absolute right, and in which there are not any claims; all the remaining ones having some decenially settled lands mixed up with Government land.

Situation of forests.

3. Most of the forests in this district are situated to the south at the foot of, and on the spurs of, the hills that run out from Hill Tipperah into British territory; but from all accounts there appears to be but little really valuable timber left, except in very out-of-the-way parts. Most of the timber used to come no doubt from the southern parts of the valleys of the Lungai and Singla rivers, on either sides of which there are detached tracts of forests divided generally by swamps. There are some forests too in the north-west of the district, at the foot of the hills.

Chief rivers down which timber goes to market, and chief markets.

4. The principal rivers down which timber, &c., get to market are the Soorma and Koosearah. The former, a continuation of the Barak, coming from Cachar flows past the timber marts of Sylhet and Shahgunj, and on the west so far as Sonamgunj, and there takes a southerly course, passing Azmerigunge, one of the largest timber marts in the district. The Koosearah, leaving the Soorma some ten miles to the Sylhet side of Budderpore, flows to the south-west, past the marts of Bhanga, Kurumgunge, old Phenchoogunge, Balagunge, Nubbigunge, and Hubbigunge.

Local supplies consumed in district.

5. Nearly all the timber that comes from the district, as well as that supplied from Cachar, appears to be used up in the district itself, very little finding its way (even as far as Boyrub Bazaar, Mymensing district,) on the Megna river.

Large consumption of timber in district, and timber becoming scarce.

6. The chief marts now in existence are at the places before mentioned, and it is from them and some smaller ones that the timber is distributed throughout the district; and the demand for wood for boat-building in particular is so great, that if a check is put on felling, and the forests taken up to be conserved and regularly worked, the supply that will then be available, together with the export from the Cachar forest (which must have suffered to some extent from having been worked for many years under a system that affords no protection to the small sized trees, and which will require to be looked after if the future is considered), will with difficulty, if at all, meet it. This applies especially to Jarul, Kurtah, and Nagussur, the woods most prized by the natives.

Situation of timber depôts.

The places best suited for depôts would be Sylhet and Azmerigunge on the Soorma river, and Balagunge and Hubbigunge on the Koosearah, and Dacca, as they are all large, important places, and well known timber marts.

Cutting of timber stopped by Magistrate.

Before August 1870, when orders from the Magistrate prohibiting the cutting of timber issued, there were no restrictions whatever on felling timber, unless the clause contained in all leases be taken as such; consequently whatever was wanted was taken without any regard to the size of the tree felled or the requirements of the future. This being the case, it could not be expected that valuable timber should still be procurable except in very remote parts of the district.

Jarul, Kurtah, and Nagussur, are the kinds of wood mostly sought after, as they are more than others used in boat-building. Of these three again Jarul is the most valuable, on account of its being useful for almost every purpose; there has therefore always been an immense demand for this wood: so much so that now it is exceedingly hard to find a large Jarul tree within a reasonable distance of a stream fit for floating. Even in the out-of-the-way parts, known as Lungai, Ujan, *i.e.* the wild, uninhabited tracts to the south-east of the district beyond our police outpost of Lungai and towards the Tipperah hills, wood-cutters have been in the habit of felling even in those parts for many years, floating the logs by degrees after heavy falls of rain down the small streams into the Lungai river and out by it to the Koosearah, down which it goes to market. More timber found its way to market from this wild tract than from any other part of the district owing to the facilities for floating and the size of the timber. A few years before the present restrictions were put on timber felling, it was found necessary to take elephants up into the forests to drag the logs from the interior of the jungle to the streams, no large trees having been left sufficiently near for gangs of men to roll in. All this tends to prove that of late year by year the stock of timber has been gradually getting reduced, and is now so small, that if the strictest measures for conservancy are not taken, there will not in a year or two be a really mature tree of Jarul, Kurtah, or Nagussur, procurable. There are doubtless patches here and there, but the difficulty and expense of removal would be so great, that no one would be induced to attempt the task of getting the timber out.

Difficulty to obtain supplies of best woods.

The parts personally inspected comprised the Dewalliah and Patharia Hills, eastern part of the Haraguj Hills, and the northern parts of the forests situated in the valley of the Lungai, and of these the tracts on either side of the Lungai river seem the most favorable for forest operations.

Tracts inspected.

The difficulties that may arise on this portion of the district being taken up will be from the possibility of the Lushais making raids, as of old, in the cold weather, and the proximity of the Tipperah territory. Nothing could be done until the boundaries between the two countries are properly marked out by the proper authorities, or some understanding come to with the Rajah of Tipperah.

The forests situated on the banks of the Singla river, and separated from the Lungai by a low range of hills, are from all accounts similar to those bordering the Lungai. Finer trees will doubtless be found nearer at hand owing to wood-cutters not having penetrated very far south from fear that the Lushais might come down on them while in the jungle; whatever would be necessary for the working of the Lungai forests, would be required for these.

The boundaries suggested for setting apart this large tract of forest land contained in the valleys of the Lungai and Singla are, to the north, Depolalacherra, flowing eastward into the Lungai from the Patharia hills; the Bhorunghacherra, flowing westwards into the Lungai from the Dewalliah hills, a line taken due east from Oylamtang Teelah to the edge of the jungle; the Roopacherra, flowing westwards into the Singla from the Chattiecherra range. To the east the Chattiecherra range; to the south the boundary line between Hill Tipperah and Sylhet district; and to the west, the boundary line between Hill Tipperah and Sylhet from Vomsoal *viâ* Torloongto to Tal Post, and from there along north to the east of the Patharia hills as far as the Depolalacherra.

The Patharia hills contain but little good timber towards the north, the trees being any thing but good specimens of their kind. There are patches of good trees here and there, but they are situated in places very difficult and hard to get at, and the removal of the timber would not be at all a remunerative undertaking. Towards the south of the range, *i.e.* as far as it lies in our territory and in the vicinity of the Tal Gong, there are some bits containing fine timber, but all of the kinds considered inferior and little valued when compared with Jarul by the natives.

The Haraguj hills to the east have been jhoomed in most places up to their summit, and there is little else but bamboo jungle to be found, except in the low ground between the talahs and close to the hills, in places where patches of ground containing mostly Jarul, Kurtah, and Nagassur, are met with.

There is an immense deal of ground between the foot of the hills and the Jooree river covered with tall grass, in which several patches of young Jarul, mostly shoots from old stumps, were met with. The young trees, in addition to being choked by the grass, were also stunted,—no doubt from being burnt every year when these grass lands are subjected to fire by the villagers. Owing to the proximity of the villages no good trees have been left in this plain land, and almost every tree in the interior of any size was felled last year. There are consequently a very few indeed large Jarul, Kurtah, or Nagassur trees to be found now; but the stock of small ones of these kinds, and of all sizes of the sorts in demand, is good, and might be protected, as though there are only three (the Sagurnal, Huskai, and Dingai,) streams for getting the logs to the Jooree, leaks could easily be made from any part at the foot of the hills to enable elephants to drag the timber to the river.

There is a very good stock of second quality timber together with fine bamboos on the low land lying along the Huckaicherra.

All to the south of the Dingaicherra and east of the Jooree river, (*i.e.* the Dhurumnuggur valley) belongs to Hill Tipperah, and large quantities of timber, canes, &c., are taken out from these parts, and also from Jooree Ujan, a toll being paid to the lessee of the Tipperah Rajah's ghât at the junction of the Jooree and Lall rivers. It was reported by the natives in March that there were logs worth from Rs. 2,500 to Rs. 3,000 lying along the river (Jooree) between the mouth of the Sagarnalcherra and old Phenchoogunge. Most of these were probably cut during 1871 and left stranded by the river falling, but the difficulty is to know from whose territory they came. Besides these, several were found in the jungle (close to the edge of the hills in British territory) cut, but unmoved.

In former years only a few logs used to be taken out with some difficulty without the help of elephants, but in 1871 nearly every Jarul, Kurtah, and Nagussur tree of any size was felled, and nearly all dragged out by elephants; so now there is nothing to be done, if these kinds of trees are considered, but to close up the jungles and strictly conserve.

The "Agar" is a valuable tree, from which a sort of incense, much prized and sought after by natives, is made; it is mostly cut by the hillmen, who take it to exchange for plains productions. A tree containing the "Agar" is easily recognized by their being bulges at intervals up the trunk, and these are the only parts cut and taken out, the wood being but little sought after.

The gum sells at Re. 1 per tola.

APPENDIX D.

REPORT ON THE BRAHMINI RIVER.

No. 194, dated Bhaugulpore, the 27th September 1871.

From—Capt. C. W. Losack, Asstt. Conservator of Forests, Bhaugulpore Division.

To—The Conservator of Forests, Bengal.

In compliance with instructions contained in your No. 219, dated 26th July 1871, I have the honor to forward for your information a detailed report of my voyage down the Brahmini river from Garjan in the Gangpur tributary mehal to Jinapore in Cuttack district, from whence to Cuttack a canal is being constructed, and will, I believe, be entirely opened between these places in the course of a very few months.

2. The Brahmini river is so named after the waters of the Koel and Sunk rivers unite about four miles north of Garjan in the Gangpur tributary mehal; but as I had already, during the last cold season, travelled over this portion of the river, viz. that between its head waters and Garjan, I did not consider it necessary to do so again. I therefore made arrangements to follow the downward course of the Brahmini to Cuttack.

Gangpur.

3. In paragraphs 7 and 8 of my annual report of Sarunda will be found an account of my journey from Udsu on the borders of Sarunda to Garjan by the Koel and Brahmini rivers, an extract of which is appended for easy reference; this shows the practicability of the rivers Koel and Brahmini from Udsu to Garjan.

4. From Garjan to the boundaries of Bonai tributary mehal there are no difficulties of any kind whatever; it is plain sailing.

Bonai.

5. My halting place at the end of my first day's journey was Pitagaon, a few miles within the Bonai tributary mehals. In the Gangpur tributary mehal I had been informed that the journey by water from Pitagaon to Darjang was impassable, but here I found one of the Rajah of Bonai's men who had been sent to meet me, and on talking to him he said he had come up the river from Darjang,—that I could go, but not my baggage; it was sent overland, while I went in about two hours by water.

6. A little over four miles from Pitagaon I came on the first rapid; up to this point it had been plain sailing. But even here there were no real obstacles, and there was a passage through the rapids, the men getting out of the boat and guiding her over, while I with seven or eight people remained seated in the boat. This rapid is named Kooradie; about a mile further on there was another rapid, named Goorguri, but this was shot without trouble. Then again about a mile further on we came on a third rapid, called Jumroodie; here also the men got out of the boat and pulled the boat over. I did not leave the boat (a canoe or dug-out)—there were two lashed together and never untied—during this portion of my voyage.

7. I will now endeavour to give you a general description of these rapids; they are formed by large stones or rocks in the bed of the river, over and round which the water rushes with considerable violence (the velocity of the stream may be judged from the fact that I made about four miles an hour without much manual labor on the part of my crew in the upper portions of the river); and although these stones were sometimes so close together as to admit of little more than the two dingies passing between them, the passage was made without danger or extraordinary labor; and had the river been 18 inches or 2 feet higher, the difficulties would have been lessened. In some of these rapids there was also a kind of fall, but its slope was not great, and the dingies passed over without injury, even without taking in water.

8. The following morning I left Darjang and reached the village of Bonai in about five hours, passing over one rapid half a mile below Darjang, but this was easily shot; the rest of the river was as good as could be wished.

9. The Rajah of Bonai treated me with the greatest possible civility, and made arrangements to forward me in his own boats and with his own servant. The boats were two large canoes lashed together, carrying most of my baggage, and resting on the top of the boats was a heavy palkee; two other canoes lashed together, in which I travelled with a small portion of

my baggage, while a fifth canoe, containing rice, &c., for the boatmen, 10 in number, accompanied me. I am thus particular in detailing the boats in which I travelled, as I consider that where laden canoes could pass, there is no impediment to rafting logs.

10. After leaving Bonai the river was very good indeed for rafting purposes as far as where it enters the tributary mehal Bamara.

Bamara.

11. After entering this tributary mehal I found it easy sailing nearly as far as Barakot; about two miles above this I found rapids, but over which we passed without difficulty of any kind. At this place I halted for the night.

12. After leaving Barakot the next day this same rapid continued for a couple of miles; I then left the main stream and came along under the right bank of the river in nice smooth water, intersected at intervals by a few rapids and falls, but easily passed over. Two feet more water, and I should never have discovered their existence until opposite Patephura, where I again got into the main stream, and here I was advised to take my baggage out of the canoe so as to avoid any chance of having it turned into the water. I took it out and it was carried 30 to 40 yards over a rock just above the level of the water. The boatmen then inspected the "rapid," or here more properly "fall." Two of them stationed themselves at the head of it up to their waists in the water and two below, one on each side; three men then took two of the canoes lashed together, brought their end on to the stream, and let them go. As the fore part came within reach of the first two men, they seized them on either side to steady them. The force of the water carrying the boats on, they were caught by the two at the foot of the fall, and the next moment the canoes were in smooth water. The length of the fall was not 30 feet; the next two were taken in the same way, but the single canoe, containing the food, was not unloaded and passed over without accident in the same way. These rapids continued as far as Koinsur.

13. After leaving this there was no trouble until arriving opposite to Parnipasse, where my things were sent by land a quarter of a mile. I however went in the canoes lashed together, and the single one with her load, and passed over the rapid with ease. I reloaded and went on to a place called Jailbanga.

14. At this point I found what I considered to be a real obstacle to further rafting, but this can be overcome, as I shall now endeavour to show.

15. This rapid and fall is steep, and the water very turbulent; here for the only time it was necessary to divide the boats that had been lashed together and to unload the single canoe.

16. The first difficulty is a sharp fall far too abrupt to allow of boats or rafts passing over it without being dashed to pieces, and at the bottom a sharp turn to the right hand in troubled water, then a piece of smooth water, and then a very bad fall indeed, but not so impracticable as the first. The distance from the head of the first fall to the end of the second is a short half mile over the first fall; it was impossible for any boat I have ever seen to have passed in safety, and the boats were passed over just at the edge, the men keeping close into the land side. At the bottom of this the boatmen got into their boats, and I went with them in one, and we passed over the lower fall; but I was very glad to find myself in the smooth water below, for I fully expected to have been upset, and in such strong water I should have not have easily got out.

17. There are in my opinion two methods by which this obstacle might be overcome,—one by blasting, the other by taking the logs by land.

18. Regarding the first of these modes, I am, I regret to say, not being an engineer, unable to offer a very decided opinion; but that several blasts would have to be made, it is easy to see, and I am not in favor of attempting it.

19. With reference to landing the logs there would be about a mile and a half to take the timber by land; but as the country is level, there would be no difficulty; it would require but little road-making. The only difficulty is a nullah, which would require a rough wooden bridge, as the banks are in most places very steep and sharp, but there is no want of timber for this purpose within a few feet of the bank.

20. After leaving the boat at the foot of the falls I walked back to the point (about a mile) at which I had got out first, and went along a foot-path through low scrub jungle maidan and rice fields, over which there would be no difficulty in passing timber on two-wheeled carts, requiring only a few days' labor to clear away the light jungle—the rice fields might be avoided.

21. Another thing is that I am of opinion it might be difficult, when commencing operations, to induce the boatmen to go so far from their homes as Cuttack, and that it would be necessary to employ two sets, so that the formation of a depôt about Jailbanga would not be unadvisable even if circumstances did not compel us to form one.

22. From Jailbanga as far as Ruila there were rapids and strong water, but the boats were passed over without being unloaded.

Talcheer.

23. After this large boats might be used as far as Jinapore, the head of the canal joining the rivers Brahmini and Mahanuddy; and I saw one of about 10 tons' burthen at Hatiadanda, from which point there is no obstacle to Damrah port; but for the present it will not be necessary to send timber beyond the canal works.

24. I do not by any means wish to under-rate the difficulties of transporting the timber over the various rapids alluded to and marked in the maps. Difficulties there are, but with care there is no danger of losing logs; and I am of opinion that it is perfectly feasible, and that it will be remunerative

General.

25. I do not think that it will at first be possible to obtain a contractor to do the râfting work; it will have to be done by the officer in charge.

26. From inquiries made during my journey, I understand that canoes can be constructed and put into the water at from Rs. 10 to 15 each, and that they can be made in about a week.

27. At a place called Gugua, in Bamara tributary mehal, I saw 20 new canoes placed side by side on the bank ready to be taken down the river.

28. I would suggest therefore that a certain number be made by the Forest Department, and that the timber be transported entirely by their means to Cuttack or such point as may be decided on after communicating with the irrigation officers in Orissa, who are greatly in need of timber and require more timber than during the first season's operations this department could possibly supply.

29. These canoes, when sent down the river, will sell for between Rs. 30 and 40, according to size,—a very indifferent one fetching Rs. 16 to 20, which would in a great measure pay the cost of rafting operations

30. In Cuttack I went with Mr. Walker, Superintending Engineer in the Irrigation Department, to the Jubbra Government workshop under his orders and in immediate charge of Mr. Faulkner, Executive Engineer, where I heard the supply of timber is a great source of anxiety.

31. Mr. Faulkner told me that Teak from Moulmein costs at the rate of Rs. 2-4 per cubic foot, but that for most purposes good Sâl would answer equally well. I am therefore confident that we could obtain from Rs. 1-12 to Rs. 2 per cubic foot for good Sâl of not less than 22 feet long by 50 inches mid girth. The only Sâl I saw in these workshops of any size, such as this department would send from Sarunda, was not more than 12 feet long; such timber, of course, being useless for the heavy beam by which the canal lock-gates are opened.

32. One difficulty I could not get over, and that was to get any information regarding rates. It must be borne in mind that my entire journey by river was through Native states, and that there to a great extent the people are the vassals of the Rajah, bound to give him service,—*vide* the case of the boatmen kindly sent with me by the Bonai Rajah, who were, so they told me, not paid for the trip, but fed only. In the face of such a system it was simply impossible to get at rates, and I could obtain no other answer even from the Rajah of Bonai himself than "what you choose to give."

33 This very system will make it difficult to obtain labor unless the Rajahs could be induced to aid us at first, and I think they would, as our success would be to their ultimate advantage as proprietors of extensive forests.

34. Many of the boatmen lead a wandering life, living on the island during the season that the river will allow of their doing so without habitations, only in the rains retiring to the main land and there building rude huts in the jungle at the river's edge, living on fish and on what they obtain from collecting the castor-oil, called "rahindee" by them, which they sell for about Re. 1 per maund.

35. Others again there are who are settled in villages and are agriculturists, only at times when there is little work in the fields taking to their boats.

36. The former would be the class of men through whom we should most likely begin to work; they are a very poor race, and their mode of living apparently precarious. Whether it would be possible to induce them to take to regular labor, remains to be seen.

37. On reaching Cuttack I went to report my arrival to the Commissioner of Orissa, and with reference to his No. 389A, dated 30th July 1871, stating the navigation of the Brahmini to be impracticable, he informed me that during one of his tours he saw the rapids at Jailbanga, and from this concluded that the river above was not navigable.

38. If you should consider it advisable to work Sarunda this cold season, I am of opinion that an officer should be detailed to Sarunda as early as possible, as he will find it no easy work to be in a position to forward timber by this route during next rains in such an out-of-the-way and thinly peopled a district.

Extract from Annual Report, 1870-71, *of Assistant Conservator of Bhaugulpore Division.*

Sarunda.

PARA. 7.—From Udsu I came by river to Garjan on the Brahmini easily in the month of March, and am confident that there would be no impediment to rafting timber immediately after the rains as far as Bonai, some 25 miles below Garjan, when it might be taken down the Brahmini later on; as the Commissioner of Chota Nagpore told me that large sized boats navigate this river from the mouth to this point at all seasons.

8. The portion of the Koel over which I went is easy of navigation for dingies, and excellent for rafting purposes; nothing could be better. And from the boatmen on the river I got information that boats can, and do, come down the river from above "Omko or Somij," a village on the opposite bank, to where the Karo joins the Koel, and that the Karo also was navigable.

APPENDIX E.

Extract from the Assistant Conservator's Annual Report for the year 1871-72.

Description of Forest Tracts in Cooch Behar.

ALL the forests, except the Dhulka Jhar, in the Darjeeling Terai, were gone through carefully, tract by tract, as follows :—

1. Mechi forests.
2. Lohaghuree terai.
3. Balasun.
4. Gareedhura.
5. Thynanoka, Noonmattee, and Rungamattee.
6. Moorgow Jhar.
7. Champassarree Jhar.
8. Dhulka Jhar.

No. 1 tract of forest is Sissoo and Khair; it covers an area of 1,183 acres, and was found to contain very little timber of value or size. It has not more than about 500 full grown trees of Sissoo and Khair,—not more than 50 of the latter. This tract is on the banks of the river Mechi, and is low, flat, sandy, and stony; it is inundated yearly more or less.

No. 2, "Lohaghuree," is a tract at the foot of Lohaghur Hills. It contains no timber of any kind, and is a small tract, slightly hilly.—Sandy soil, with very heavy grass jungle.

No. 3, "Balasun."—Sissoo and Khair on the banks of the Balasun. On this tract, which is almost the same as No. 1, there is little or no full grown timber; it contains more Khair than Sissoo. Timber on this tract, and also No. 1, never grows to any great size, and many of the trees are hollow; this is caused by the floods, which carry stones and all kinds of things with it, which hurt the young trees by knocking off the bark; the tree then rots.

No. 4, "Gareedhura"—a very small patch of Sissoo and other jungle on the bank of the Rucktie river and near the slopes of Bamunpokree—has a few full grown trees on it, about 100. This is a flat, sandy piece of land, and is really the old bed of Rucktie, on the slopes of Bamunpokree, which is near the last-named patch. There is no timber to speak of: there are about 50 full grown Challownee and Magnolia.

No. 5, "Rungamattee," is a tract from the Rohnee Jhara to Sookna, on new cart-road, a narrow strip of about 1,850 acres; has a few young Sâl trees, but no matured timber of any kind. This tract is broader near Sookna or cart-road, and is sandy about a foot below the surface, the top being dark, rich looking soil; near the Rohnee the land is low and damp; near the cart-road or Rung Thung river, it is high and well drained land, but covered with heavy grass jungle and common jungle trees.

No. 6, "Moorgow Jhar."—This tract is from Sookna or cart-road to Mahanuddy river, at foot of the hills; is well drained land for the most part, and very rich soil. Is the same as No. 5, has heavy grass jungle with a few young Sâl trees on it; no matured timber. All matured timber was cut in former years by a Mr Dear; all the good timber was cut in the Terai by Mr. Dear. From Mechi to Sivoke there is about 2,688 acres; of this more than half is waste land with grass only on it. Many patches of this tract, as also No. 5, have been cleared and cultivated in former years by Mechies, a very wild and uncivilized race of people, who wander from place to place, never stopping for more than two years in one place.

No. 7, "Champasarree Jhar."—This tract of country runs from Mahanuddy to Sivoke on the Teesta; it has no matured timber on it. All full grown or timber of any size has been cut. About one-half of this tract is complete waste, with nothing on it. Area about 7,557 acres. Here and there a few patches of young Sâl are met with. The land is rich and good, and for the most part well drained. The soil is the same as Nos. 5 and 6 till within 4 miles of Sivoke, where a long slip of land is met with joining the Rajah of Julpigoree's land, called Bycuntpore forests. This strip is well stocked with very fine Sâl about three parts grown; the land is very well drained, high, and sandy, with dark soil on top. From this patch a large supply of timber may be got in some 30 years hence. As the ground gets higher, the Sâl gets better and of a larger size. Joining this tract, at Sivoke Jhara, a strip of land runs down by the bank of the Teesta; it has little or no timber on it. There are some 100 young Sâl trees, and a few Sissoo, but none of any size.

No. 8, "Dhulka Jhar," was not regularly gone through this year, as it was inspected last year. Dhulka Jhar may be said to be the only tract with timber of any size on it in the Terai, on the west of the Teesta. I would not recommend any attempt of any kind of improvements in the Darjeeling Terai, except to keep open such forest roads as there are, namely—

1. From Balasun to Lohaghur *viâ* the Sissoo patch No. 1.
2. Traces cut in the Dhulka Jhar in 1870-71, kept clear, one road from Sookna on cart-road to Sivoke, *viâ* Mahanuddy, all at a cost of about Rs. 300.

The tract of Sâl forests just at Sivoke, noted as No. 7, might have the creepers cut and useless trees; about 300 acres was cleared last March and April.

There is little or nothing to be done in the way of clearing rivers in this sub-division, or bridging.

In the hills of Sikkim sub-division there are the following tracts :—

1. Mohaldram, from Jore bungalow to Kurseong.
2. Lot Punchar, from Rungee Room to Goramara hills.
3. Outer hills, from Rung Thung to Teesta river.
4. Merig.
5. Lohaghur.

No. 1 tract is well stocked with timber of kinds, Magnolia, Oak, Chestnut, &c.; some of this timber is fully matured, and will never be better than it now is. There is a greater number of Oak than any other trees on this tract. At present there is no market for timber off this range of hills, and it is impossible to remove it to a market at any distance without a very great outlay of money. A number of trees, principally Chestnut, are sold yearly to contractors, who remove these themselves (timber removed by purchasers).

No. 2 is a very large tract of forest, and is very well stocked with timber, such as Challownee, Toon, Sâl, &c., a few Chestnut, Oak, and Magnolia on the upper ranges, but it is almost impossible to have it removed. The timber is only at present useful for shingles and light scantlings, which natives cut on the spot and carry to market or supply private parties with for house building, &c. The lower range of Lot Punchar, which comes down to the head of the Mahanuddy, is very rich in Toon, Sâl, and other timber, such as Urjoon, &c. This timber could come down the bed of the Mahanuddy if a small cart tract was made to the foot of the hills or head of the river; but as there is now no market for timber, I would not recommend any felling of timber in Sikkim at all. Toon is generally sold on the spot where it stands, and is cut up and removed in planks, &c., for tea boxes by the purchasers, which is really the only use Toon is put to in this district.

No. 3.—These hills over Sivoke, and running to Sookna and up to Sindaree, are well stocked with Sâl, Toon, and other trees, except on the very lower slopes at Sivoke Jhara and on the west of Mahanuddy, where all full grown Sâl has been cut. It is impossible to form an idea what supply these hills would give, as no regular survey has been made; but there is no doubt that a very large supply could be got if it could be removed from the hills. The hills from Sivoke up the valley of the Teesta, and joining Lot Punchar on the west, have had nearly all the good Sâl cut by the Forest Department in 1869, and by the villagers on the east of Mohaldram and joining the hills on the banks of the Teesta, as far as Rayong. Timber cannot be got out except in planks, shinglings, scantlings, &c., as there is a valley or gorge which makes it difficult, if not impossible, to get timber to the Teesta or Mahanuddy.

No 4, "Merig," is a small tract of hills without any timber of any kind on it; it would do well for planting purposes.

No. 5, "Lohaghur."—This tract has some fine young Sâl on it, but very little matured timber; it would not give more than about 100 full grown trees, if so much. The Sâl on this range of low hills is not so good as it is found on the other hills of the district; it looks well, but is spongy and soft. I am of opinion that it would be useless to try anything to improve these hill tracts beyond preserving strictly from fires villages and large herds of cattle, bathans, &c.

Bhútan Sub-division.

1. Leesh and Gheesh.
2. Toondoo or Mynagooree.
3. West of Moortee river, or part of Mynagooree.
4. Mooraghat.
5. Luckeepoora.
6. Boroghar Latalie.
7. Buxa.

No 1 tract, Bhútan sub-division, may be said to commence on east bank of the Teesta near Sivoke. Although it is said to be in Sikkim sub-division, it is in the district of Julpigooree; I therefore put this tract in Bhútan division. It runs at the foot of the hills known as Dumsung sub-division to Leesh and Gheesh, covering an area of about 2,000 acres. It is dense grass and creeper jungle, with common trees on it here and there, till the Rungdung Jhara, which is simply "nall" jungle and the homestead and stronghold of elephants and rhinoceros The first part of this jungle, on crossing the Teesta, is high ground and very rich, sandy soil and well drained; there is not more than about 20 Sâl trees on it. From Teesta to Rungdung Jhara it is complete waste land. On crossing the Rungdung Jhara the land is undulating, well drained for the most part, but poor, and red sandy clay without any surface soil. No Sâl trees of any kind are on this last patch; there is dense grass, and here and there creeper jungle.

No. 2, "Mynagooree" Toondoo forests is from Durlah to Juldoca, and covers an area of 41,737 acres. It is principally flat land with small nullas here and there, and has a good stock of very *stunted half burnt sâl* on it with very few of any size: in fact, no tree fit to cut. It is a very large tract, high and without swamps, and no doubt would have good timber on it if jungle fires could have been kept out, but it is burnt year after year and all young Sâl killed, and the half grown trees so injured, that many of them die and some become *stunted* and grow up with a lot of little branches all round the tree; very often the leading shoot is killed when very small, which makes the tree almost useless.

I went twice through this tract on elephants,—once through a part with the Conservator. I would recommend two lines or roads being cut through this tract,—one from Teesta through No. 1 tract, from west to east, or to the head of the Juldoca, and one from near Ramshi Haut to foot of hills, south to north.

No. 3—This is a patch of Sissoo on the banks of the Juldoca. It is a small block and has very little mature timber on it; some 50 logs might be got off this patch, but not more. Sissoo on these streams never come to much, as the rivers are continually changing their course, and the timber does not get time to grow. I do not think much can be done to improve this strip of Sissoo, and do not think grazing does much harm. Jungle fires do not go into it.

After passing tract No. 3 a small patch of Sissoo and Khair is met; it is of no value, and is not marked in the maps. There is no mature timber on it.

No. 4, "Mooraghat forests."—This is by far the best forest now held by the Forest Department; it covers an area of 28,833½ acres. The soil is very rich, of a dark color. Here and there it is stony and sandy, but not very much so; it is very well drained, and for the most part well stocked with Sâl and a few Challownee There are many mature or full grown timber on this tract, which should be cut. I should say not less than 500 to 600 trees might be cut this coming cold weather, but it is a large undertaking, such a number. There is much heavy grass jungle in one or two pieces, also many creepers. The best timber on the tract is down the Noonie river, towards the Fallacotta road, to the south end of the block. This forest would supply yearly about 250 logs of good size if looked after and jungle fires kept out, which would be very easy if there were (say) three watchers placed on the tracts for January, February, March, and April, as it is detached and has many creepers and jungle almost all round it, which does not harm.

No. 5, "Luckeepore."—This is all Sissoo forests, and covers an area of 4,033 acres. There are on this a few well grown trees, but very few; not more than 200 could, I think, be found of mature timber. The soil is sandy, as all these Sissoo barrees are. It is on the banks of the Rehteenuddy and some other small streams There is also some Khair, but of no size. It could not be estimated what this tract or tracts would give yearly, or any of this kind of forest, as the rivers change so often and carry away large patches of Sissoo yearly.

No. 6, Borojhar Latalie Sâl forest, is a very large tract of forest or land held by the department, but not much more than three parts of it contain timber. The area is 28,862 acres; it is flat land with low, damp patches here and there. The soil is of a heavy reddish colored clay, looks rich, and is not very sandy. The Sâl trees look stunted and unhealthy in parts, and in other parts very healthy The west end is well drained and also the eastern end, but about the middle it is a little swampy. There are many old Sâl trees on it of good size, but of a bad kind; they are knotty with large branches. They are also very crooked I should say this forest would give about 500 full grown trees, which should be cut. I went through this forest twice in the past year.

No. 7, "Buxa forest."—This forest includes the following 12 blocks or patches:—

1. Pomalgooree Chotomale.
2. Meetur Domohonee.
3. Minagaon.
4. Suniasee Jhar.
5. Boromalee.
6. Panbarree.
7. Chooapur Jajanghee.
8. Rainotong.
9. Natabarree.
10. Ateabarree Dhaldobree.
11. Oodlagooree.
12. Patkapara.

The soil is rich of nearly all the 12 blocks, is dark in color, and sandy below the surface; there are a few swamps, but not many to speak of. As a rule, it is well drained by nullas and small streams; it contains Sâl timber mostly, with a few Sissoo, Khair (Champ), Magnolia, also India-rubber trees mixed with many kinds of common jungle trees. There are large patches of heavy grass where there are no Sâl or timber trees. Much of the fine timber was cut before it came under the British Government; it yet contains a large supply of timber of mature size, both Sâl and Sissoo and a few Magnolia,—the latter near the foot of the Buxa hills on the sloping ground. Area 103,690 acres. The best timber is met with on the northern parts of the tracts. It would be impossible to say what quantity of mature timber these tracts would yield, as I have not been able to go carefully through them tract by tract, but they would yield a large number of logs.

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APPENDIX F.

Note on Forests in the United States, translated from "Revue des Eaux et Forêts Annales Forestières."

For the past thirty years constant attention has been drawn by economists to the impoverished state of France in the matter of timber, and to the necessity there is of reproducing timber of large dimensions. Unfortunately there exists in the public mind a very prevalent, but erroneous, idea in the matter, which has hitherto prevented any serious notice being taken of the warnings given. The general impression is, that foreign countries, and especially America, will yet for a very long time furnish inexhaustible supplies of timber. We propose to show what are the actual resources of the forests of the United States, and how small a hope there is that they will in the future provide the wants of the old world. Our information is drawn from the official correspondence of the American Government.

When the first Europeans established themselves on the American coast, they were confronted by impenetrable forests, which for a long time presented serious obstacles to progress in colonization. Fifty years ago forest tracts in the United States were out of all proportion to the requirements of a thinly scattered population. Means of transport for timber to distant ports did not exist; the forests were a real nuisance; and the destruction of them appeared to be a necessity to the then growing population.

War was waged against the forests with inconceivable animosity, and so effectually, that the invaders have reached the extremity of these forests, which were reported to be impenetrable, leaving only a few scattered trees to mark their former existence; and at the present time they find themselves confronted by an immense desert without trees, extending from the Mississippi to the Rocky Mountains,—a tract which is equal in extent to the area of Central Europe.

Thus, then, there remains at the present time only a remnant of the former forests, and this is daily *de*creasing before the ever *in*creasing population and the consumption of planters who are gradually clearing vast tracts around them.

At the present time the scarcity of forests in the country is being felt very seriously by all classes of the American population, whereas formerly it was not felt at all; now there is an immense population and large consumption, whereas formerly there was only a small destructive population.

Thus the American people, who at first imagined that their existence and progress were incompatible with the existence of forests, are now forced by experience to learn that they can neither exist nor prosper without forests.

With the exception of the mountainous regions in the Alleghanies and Blue Mountains, almost all the vast expanse of country from the Atlantic Ocean to the Mississippi has been cleared of the primeval forests. All the arable lands have been cleared, and the rocky and steep tracts alone remain forest clad.

Actual waste is now no doubt much less than it used to be, but actual consumption of timber has increased in large proportions. It must be remembered that in truth the forests of the Alleghanies have had to meet the requirements of an ever-increasing population (from 3 to 38 millions), and that the stock of large timber, which appeared at one time to be inexhaustible, has been devastated by the original settlers. It is a fact that three-fourths of these mountain stocks do not now exist; the demand for timber is already beyond production, and the consuming population has rapidly risen from 38 to 50 millions. In another fifty years under the present system the forests of the United States will be exhausted, and will scarcely meet local consumption. To be convinced on this point it is only necessary to pass in review the various states with reference to the existing forests in them. The states of Maine, Michigan, Minesota, and Florida, are the only ones to the east of the Mississippi in which exports are greater than the imports; but their stocks, which have been accumulating in the forests for centuries, are decreasing rapidly, and one can already foresee that in a few years the produce will be absorbed by local wants.

In Central America (Arkansas, Missourie, Nebraska, &c.,) there are only occasional scattered topes of trees along the banks of streams; these are unable to meet local consumption, and the surplus required for use is drawn from the states of Michigan, Wisconsin, and Minesota.

The states situated between the Rocky Mountains and the Pacific are still stocked with fine and important forests, but the produce of these is not greater than is required to meet the wants of a population always on the increase by means of immigration.

In the new territories of Arizena, New Mexico, Colorado, Wyoming, Montana, Joaho, and Dakota, the forests are inconsiderable, and could scarcely provide the wants of a population even as scant as that of Illinois.

Lastly, the territories of Vanconver's Island and Alaska, which are rich in forests, export almost all their timber to China and Japan.

From this sketch it will be seen that the United States, far from being a reserve from which the old world can draw timber supplies, are scarcely able to meet their own local consumption, and are threatened at no distant period with a timber famine. This state of things is now occupying the attention of a large number of far-seeing American agriculturists, as this dearth of timber is a serious obstacle to the cultivation of many fertile tracts of country. The state of Nebraska, containing an area as large as England, is completely cleared of all timber. The result of this is, that the severe draughts of summer are obstacles to agriculture. Here timber is so scarce that planters are forced to live in holes made on sides of hillocks, there being no posts or planks with which to build houses.

In order to encourage tree planting and stimulate individual enterprise the Government of Nebraska has passed a law under which whoever plants an acre of land with forest trees is exempt for five years from all tax on a portion of his lands, valued nominally at 100 dollars.

The young plants are to be at a maximum distance of 12 feet apart; if they are between 12 and 33 feet, the reduction of tax is only one-half.

A similar law is urgently called for in Illinois, Utate, and Jowah; in this last state only $\frac{1}{100}$th part of the land was under forest in 1869

In Michigan and Massachusetts agricultural societies have taken the initiative to stimulate planting by the offer of premia and prizes to persons who plant trees.

At the same time that a timber famine threatens certain portions of the United States, formidable meteorological disturbances, which always accompany disforesting, have made their appearance. Continued droughts desolate the plains of Kansas and Nebraska, and in other places inundations unknown fifty years ago devastate the valley of the Mississippi. Official reports and correspondence on the subject of keeping open communications show that the bridges have to be continually enlarged to admit of the passage of the increased floods, and that roads which formerly were made in the valleys in safe localities are now actually inundated.

Such a state of things, resulting from immoderate use and abuse during some two centuries of the supplies provided by Nature, is now exciting in the United States a real and natural anxiety.

May this picture serve as an example to France and those who might be tempted to lay hands on the forest property which our fathers have bequeathed to us, and enable them to understand that forests are not only sources of revenue, but indispensible auxiliaries to progress of civilization.

APPENDIX G.

Statement showing the value of timber and planks imported into Calcutta during the last ten years from 1861-62 *to* 1870-71.

		1870-71.	1869-70.	1868-69.	1867-68.	1866-67.	1865-66.	1864-65.	1863-64.	1862-63.	1861-62.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Boards and planks.	United Kingdom	.....	.....	7,667	21,224	52,745	22,096	22,103	4,877	10,525	7,782
	Suez	.....	.....	.....	.....	.....	.....	.....	251	.....	.....
	France	.....	.....	.....	.....	.....	.....	.....	.....	600	580
	Germany ...	.....	.....	.....	.....	.....	.....	.....	8,666	11,565	.....
	Hamburg ...	.....	.....	.....	.....	.....	.....	32	.....	1,815	2,816
	Bremen	.....	.....	.....	.....	.....	...	.....	830	.....	.....
	North America	.....	.....	.....	.....	71,294	70,606	63,039	44,376	66,057	76,298
	Ceylon	.....	.....	.....	158	160	.....	.....	.....	16	51
	Mauritius ...	.....	.....	.....	.....	.....	.....	25	.....	173	.....
	Penang	.....	.....	7,667	3,408	30,073	38,081	32,428	2,933	1,471	.....
	Maldives ...	.....	.....	.....	.....	.....	58	.....	.....	.....	.....
	Persian Gulf ...	.....	.....	.....	45	.....	.....	.....	.....	.....	.....
	China	.....	.....	.....	.....	.....	27,459	.....	120	.....	.....
	Cape	.....	.....	.....	.....	.....	.....	.....	.....	17,440	.....
	New South Wales.	.....	.....	.....	265	.....	18,058	185	67	15,192	33,071
	Other foreign countries.	872	364	1,042	.....	.....	.....	.....	.....	.....	240
	Bombay	1,475	1,725	.....	.....	.....	.....	366	.....	.....	427
	Madras	76	2,315	.....	.....	4,300	3,357	50,225	.....	120	2,190
	Moulmein ...	.....	.....	.....	.....	.....	.....	.....	.....	25	.....
	Rangoon ...	.....	.....	.....	.....	.....	.....	1,00,383	.....	.....	.....
	Akyab	.....	.....	.....	.....	395	7,305	.....	.....	43	.....
	Chittagong ...	.....	.....	.....	.....	24	.....	.....	.....	.....	.....
	Balasore... ...	.....	.....	.....	.....	5,660	18,507	10,240	13,805	.....	.....
	Cuttack	.....	.....	.....	.....	7,874	.....	1,800	.....	.....	.....
	Port Blair ...	.....	.....	.....	.....	264	.....	.....	.....	.....	.....
Mahogany.	United Kingdom	.....	.....	.....	.....	950	1,031	3,792	4,790	8,599	1,890
	France	.....	.....	.....	.....	.....	500	.....	.....	69,451	.....
	North America	12,208	.....	.....	28,236	3,476	.....	10,905	.....	.....	1,263
	Cape	.....	.....	.....	.....	.....	.....	.....	.....	4,157	.....
Masts and Spars.	United Kingdom	.....	.....	.....	5,485	14,308	3,548	12,994	9,489	3,246	3,132
	France	.....	.....	.....	.....	.....	.....	.....	.....	.....	120
	Germany ...	.....	.....	.....	.....	.....	.....	.....	.....	961	.....
	Hamburg ...	.....	.....	.....	.....	.....	1,360	4,321	1,500	.....	600
	Bremen	.....	.....	.....	.....	.....	.....	.....	2,101	.....	.....
	North America	.....	.....	.....	8,878	15,199	18,703	16,583	20,750	35,129	53,369
	Mauritius ...	.....	.....	.....	.....	.....	.....	750	.....	661	.....
	Bourbon ...	.....	.....	.....	.....	.....	.....	540	64	.....	.....
	Cape	.....	.....	.....	.....	.....	.....	.....	.....	470	.....
	Ceylon	.....	.....	.....	100	.....	.....	130	.....	.....	.....
	Penang	.....	.....	.....	1,160	.....	.....	9,177	900	.....	.....
	China	.....	.....	.....	.....	.....	.....	105	.....	350	.....
	New South Wales.	.....	.....	.....	.....	.....	.....	47,964	520	250	.....
	Other foreign countries.	4,217	7,590	10,325	.....	.....	.....	.....	.....	.....	.....
	Bombay	.....	.....	.....	.....	.....	800	250	22	.....	.....
	Madras	.....	.....	.....	.....	.....	.....	550	68	34	.....
	Akyab	.....	.....	.....	.....	123	.....	.....	.....	.....	.....
	Cuttack	.....	.....	.....	296	.....	.....	.....	.....	.....	.....
Sál ...	Balasore... ...	.....	.....	.....	4,748	.....	.....	.....	.....	.....	.....
	Cuttack	.....	.....	.....	8,841	.....	.....	.....	.....	.....	.....
Sleepers, &c.	United Kingdom	.....	.....	.....	25,301	3,04,632	90,144	2,005	58,600	250	9,727
	France	.....	.....	.....	10	.....	.....	.....	.....	.....	.....
	Bourbon... ...	.....	.....	.....	30	.....	.....	.....	.....	.....	.....
	Penang	.....	.....	7,962	1,20,513	.....	2,076	.....	4,565	.....	.....
	New South Wales.	.....	.....	.....	.....	26,711	9,055	.....	.....	.....	.....
	Other foreign countries.	1,260	1,984	7,729	.....	.....	.....	.....	.....	.....	.....
	Rangoon ...	.....	.....	.....	45,878	2,435	10,247	.....	10,505	.....	.....
	Akyab	.....	.....	.....	37,707	79,604	53,818	61,422	11,345	.....	.....
	Moulmein ...	.....	.....	.....	1,560	.....	.....	.....	3,296	.....	.....
	Madras	.....	.....	.....	16	1,000	.....	.....	130	.....	.....
	Chittagong ...	.....	.....	.....	.....	.....	700	.....	.....	.....	.....
	Balasore... ...	.....	.....	.....	.....	3,850	5,823	.....	.....	.....	.....
	Cuttack	.....	.....	.....	.....	10,296	.....	.....	.....	.....	.....
Teak ...	Penang	.....	.....	.....	.....	1,965	.....	.....	.....	.....	.....
	Bombay	.....	.....	810	.....	100	.....	50	32	.....	.....
	Moulmein ...	12,63,940	13,55,899	.....	11,73,204	9,65,757	21,54,184	7,92,671	9,23,569	22,97,511	14,48,882
	Akyab	.....	.....	.....	.....	.....	.....	.....	4,312	.....	73,896
	Rangoon ...	2,07,977	3,96,024	12,56,400	3,47,791	7,80,703	3,46,664	53,234	3,40,037	6,92,064	70,085
	Madras	.....	.....	7,952	.....	.....	.....	.....	.....	.....	460
	Chittagong ...	.....	.....	.....	.....	.....	.....	.....	1,120	.....	.....
	Cuttack	.....	.....	.....	.....	.....	.....	.....	1,050	.....	.....
	Total ...	14,92,034	17,65,901	13,07,554	18,84,854	24,42,898	29,04,180	12,98,269	14,74,190	32,29,175	17,86,379

CALCUTTA CUSTOM HOUSE,
19*th February* 1872.

J. D. MACLEOD,
Collector of Customs.

Form No. 21.

FOREST DEPARTMENT, BENGAL.

Annual Summary of Revenue and Expenditure in the different Divisions during the year 1871-72.

Classification.	Direction.	Cooch Behar.	Assam.	Bhaugulpore.	Chittagong.	Dacca.	Total.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
I.—Sale of timber at depôts ...	.....	11,564 6 1	1,317 3 3	.....	.....	.....	12,881 9 4
II.—Ditto ditto removed by purchasers, &c. ...	.....	1,650 14 0	.....	.....	.....	.....	1,650 14 0
III.—Duty on foreign timber ...	.....	.....	.....	.....	.....	.....	.....
IV.—Permit fees, rent from squatters, &c. (includes collections by civil officers) ...	.....	5,175 13 9	38,208 5 4	327 4 0	47,418 9 7	12,160 0 4	1,03,290 1 0
V.—Grazing dues and fisheries ...	.....	2,704 12 0	.....	.....	.....	.....	2,704 12 0
VI.—Sale of fruits, babool pods, India-rubber, &c. ...	.....	18,136 13 0	.....	.....	.....	.....	18,136 13 0
VII.—Ditto confiscated timber ...	.....	.....	.....	.....	.....	.....	.....
VIII.—Fines and forfeitures ...	.....	57 0 0	133 13 0	6 0 0	.....	.....	196 13 0
IX.—Miscellaneous ...	.....	78 0 0	9 12 0	0 13 0	140 0 0	.....	228 9 0
Total ...	.....	39,367 10 10	39,669 1 7	334 1 0	47,558 9 7	12,160 0 4	1,39,089 7 4
Expenditure.							
A.—Conservancy and Working.							
I.—Timber expenses ...	.....	12,961 0 0	4,493 14 0	115 15 0	.....	.....	17,570 13 0
II.—Purchase of stock and cattle ...	.....	791 13 0	9,047 10 0	468 12 0	661 4 0	218 12 0	11,188 3 0
III.—Feed and keep of cattle ...	.....	995 6 0	1,878 15 0	396 6 0	.....	8 15 0	3,279 10 0
IV.—Rent of leased forests ...	.....	.....	.....	.....	.....	.....	.....
V.—Charges in collecting revenue on grass, &c. ...	.....	5,671 3 0	.....	.....	.....	.....	5,671 3 0
VI.—Plantations ...	.....	3,470 3 0	353 8 0	7 10 0	235 12 0	.....	4,067 1 0
VII.—Forest work ...	.....	.....	165 1 0	.....	.....	.....	165 1 0
VIII.—Forest survey ...	.....	105 8 0	152 15 0	193 5 0	90 11 0	26 6 0	568 13 0
IX.—Experiments on timber ...	.....	.....	.....	.....	.....	.....	.....
X.—Communications and buildings ...	.....	955 3 0	210 11 0	.....	192 11 0	39 6 0	1,397 15 0
Total conservancy and working ...	.....	24,950 4 0	16,302 10 0	1,182 0 0	1,180 6 0	293 7 0	43,908 11 0
B.—Establishments.							
I.—Salaries ...	20,411 6 5	6,610 15 0	8,933 2 0	6,943 3 0	6,062 14 0	1,509 5 0	50,469 13 5
II.—Allowances ...	3,106 10 9	1,746 9 0	2,165 6 0	1,286 1 0	924 10 0	568 14 0	9,798 2 9
III.—Contingencies...	1,043 12 1	670 9 0	826 15 0	360 2 0	311 12 0	49 15 0	4,163 1 1
Total Establishment ...	25,461 13 3	9,028 1 0	11,924 7 0	8,589 6 0	7,299 4 0	2,128 2 0	64,431 1 3
Grand Total of Expenditure ...	25,461 13 13	33,978 5 0	28,227 1 0	9,771 6 0	8,479 10 0	2,421 9 0	1,08,339 12 3

Form No. 22.

Annual Abstract Account of the Cash Transactions of the Forest Department, Bengal, during 1871-72.

Heads of Accounts.	Rs. A. P.	Rs. A. P.
To cash balance in hand on 1st April 1871—		
Cooch Behar...	449 15 9	
Assam (Upper and Lower)	641 0 10	
Bhaugulpore	469 6 9	
Chittagong	349 4 8	
		1,909 12 0
„ Revenue received—		
Cooch Behar...	35,408 8 1	
Assam	1,460 12 3	
Bhaugulpore	6 13 0	
Chittagong	41,684 6 4	
		78,560 7 8
„ Remittances from State treasuries—		
Direction	24,169 0 3	
Cooch Behar	37,646 12 2	
Assam	28,630 7 0	
Bhaugulpore	9,634 0 6	
Chittagong	8,100 0 0	
Dacca	2,424 11 2	
		1,10,604 15 1
„ Advances recovered—		
Cooch Behar	8,718 3 5	
Assam	8,186 13 7	
Bhaugulpore	2,625 0 4	
Chittagong	98 0 0	
Dacca	19 11 2	
		18,647 12 6
„ Income tax—		
Direction	180 0 0	
Cooch Behar	47 7 0	
Assam	89 0 5	
Bhaugulpore	72 4 8	
Chittagong	33 1 10	
Dacca	12 13 0	
		434 10 11
„ Conservator's subscription to the United Service Family Pension Fund		1,112 13 0
„ Official postage...		384 9 4
Total		2,11,655 0 6

Heads of Accounts.	Rs. A. P.	Rs. A. P.
By expenditure of the Department—		
Direction	25,461 13 3	
Cooch Behar	33,978 5 0	
Assam	28,227 1 0	
Bhaugulpore	9,771 6 0	
Chittagong	8,479 10 0	
Dacca	2,421 9 0	
		1,08,339 12 3
„ Remittance to State treasury—		
Cooch Behar	35,392 5 2	
Assam	386 11 3	
Bhaugulpore	.....	
Chittagong	41,684 6 4	
Dacca	26 12 0	
		77,490 2 9
„ Advances made—		
Cooch Behar	9,838 2 6	
Assam	8,973 7 6	
Bhaugulpore	1,812 12 6	
Chittagong	98 0 0	
Dacca	.....	
		20,722 6 6
„ Balance in hand on the 31st March 1872—		
Cooch Behar	1,993 0 2	
Assam	2,099 12 9	
Bhaugulpore	616 4 7	
Chittagong	0 0 3	
Dacca	8 15 11	
		4,718 1 8
„ Official postage		384 9 4
Total		2,11,655 0 6

Form No. 23.

FOREST DEPARTMENT, BENGAL.

Annual Statement of Outstandings and Liabilities of the Department on Account of Contractors and Disbursers for 1871-72.

		Department Debtor.		Department Creditor.			Balance.
		Recoveries in cash and value of supplies and work done during the year.	At close of year.	At commencement of the year.	Payments made during the year.	At close of year.	
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Carting Timber ...	Cooch Behar ...	6,322 13 0	6,322 13 0	10,996 10 9	9,157 7 0	20,154 1 9	13,831 4 9
	Assam	.....	.....	.....	.....	.....	.....
Sawing Timber ...	Cooch Behar ...	2,528 6 7	2,528 6 7	2,602 13 4	78 10 8	2,681 8 0	153 1 5
	Assam	.....	.....	.....	.....	.....	.....
Felling and Floating ...	Cooch Behar ...	1,886 11 0	1,886 11 0	1,924 11 0	212 0 0	2,136 11 0	250 0 0
	Assam	3,860 11 0	3,860 11 0	727 1 0	5,609 12 0	6,336 13 0	2,476 2 0
Plantations	Cooch Behar ...	.....	.....	75 0 0	160 0 0	235 0 0	235 0 0
	Assam	.....	.....	.....	.....	.....	.....
Other works	Assam	2,326 2 7	2,326 2 7	42 9 4	3,363 11 6	3,406 4 10	1,080 2 3
	Cooch Behar ...	.....	.....	32 0 0	230 0 10	262 0 10	262 0 10
Miscellaneous ...	Bhaugulpore ...	1,625 0 4	1,625 0 4	.....	1,812 12 6	1,812 12 6	187 12 2
	Chittagong ...	98 0 0	98 0 0	.....	98 0 0	98 0 0	.....
Total ...		18,047 10 6	18,647 12 6	16,400 13 5	20,722 6 6	37,123 3 11	18,475 7 5

Form No. 24.

FOREST DEPARTMENT; BENGAL.

Statement of Timber brought to Depôts from the different Forest Divisions during 1871-72.

Name of river or division.	Forest.	Description of timber.	Pieces.	Cubic feet.	Total of each river. Pieces.	Total of each river. Cubic feet.	Remarks.
Cooch Behar	Siligoree ...	Sál sleepers	54	180			This is only fresh timber brought from the forests during the year and brought into stock at depôts; it does not include work done during the year in transferring from *forest* to *station* depôts, for which see Form 27.
		Planks and scantlings ..	98	.....			
		Karla khumbas ...	90	.....			
	Julpigoree ...	Planks and scantlings ...	520	.....			
	Leesh and Geesh..	Sál sleepers	1,500	5,104			
	Alipore	Shingles	625	.....			
	Moraghat	Karla khumbas... ...	121	.....	3,008	5,284	
Assam ...	Makoom	Mokoi logs ...	35	821			
		Sam " ...	2	56			
		Poma " ...	6	132			
	Tipling	Sam " ...	6	75			
		Poma " ...	36	443			
		Teeta choppa " ...	1	15			
		Bola " ...	2	25			
		Koroi " ...	5	57			
	Telpance	Uriam " ..	104	2,053			
		Ajar " ...	40	691			
		Nahor " ...	28	530			
	Soorungchur ...	Gendhelee poma " ...	7	95			
		Gemeseri " ...	2	53			
	Bunderchutta ...	Ajar " ...	18	249			
		Nahor " ...	54	1,066			
		Jomook " ...	22	345			
		Sam " ...	45	794			
					413	7,500	
		Total ...	.....	.....	3,421	12,784	

Form No. 25.

FOREST DEPARTMENT, BENGAL.

Annual Timber Account for 1871-72.

Particulars.	Pieces.	Total.
I.—Stock in hand at the following depôts at commencement of the year.		
1. At Station Depôts—		
Cooch Behar Division.		
Logs 1,926		
Sleepers 14,334		
Planks and scantlings ... 264		
Karla khumbas 360	16,884	
2. At Forest Depôts—		
Forest Division.		
Logs 7,118		
Sleepers 10,169		
Planks and scantlings 340		
Karla khumbas 244	17,880	
		34,764
II.—Timber received at the depôts from the forests.		
1. At Station Depôts—		
Cooch Behar Division.		
Logs		
Sleepers 54		
Planks and scantlings ... 618		
Karla khumbas. 90	762	
Assam Division.		
Logs	413	
2. At Forest Depôts.		
Cooch Behar Division.		
Sleepers 1,500		
Shingles 625		
Karla khumbas 121	2,246	
		3,421
Total	.....	38,185

Particulars.	Pieces.	Total.
I.—Timber removed by purchasers from depôts.		
Cooch Behar Division.		
Logs 513		
Sleepers 843		
Shingles 625		
Karla khumbas 209	2,190	
Assam Division.		
Logs	89	
II.—Timber lost and used by the department.		
Logs 281		
Sleepers 205		
Planks and scantlings ... 143	629	
		2,908
III.—Stock in hand at close of the year.		
1. At station depôts—		
Cooch Behar Division.		
Logs 2,511		
Sleepers 14,060		
Planks and scantlings ... 691		
Karla khumbas 337	17,799	
Assam Division.		
Logs	324	
2. At Forest Depôts.		
Cooch Behar Division.		
Logs 5,515		
Sleepers 11,119		
Planks and scantlings ... 394		
Karla khumbas 126	17,154	
		35,277
Total	.....	38,185

NOTE.—The number of pieces lost and used by the department is explained as follows:—

Of the 281 logs—250 pine logs were burnt in Independent Sikkim, 3 logs were lost in floating, 17 Sissoo logs were lost at Godagaree by a sudden rise of the Ganges, and 11 Sál logs were sawn into planks and scantlings, and have been shown as receipts at station depôts during the year.

205 sleepers—167 half rotten and rejected sleepers at Julpigoree, and 38 at Siligoree, were cut up into planks, rail posts, &c., for the Siligoree inspection bungalow; those not used are shown among the receipts at station depôts during the year.

143 planks and scantlings were also used for the building above stated.

Total ... 629 pieces.

Form No. 26.

FOREST DEPARTMENT, BENGAL.

Statement showing the amount realized on account of the different classes of Timber sold during 1871-72.

Divisions.	Number of logs and pieces.	Average cubical contents per log.	Amount realized on account of timber sales.	Average amount per log.	Average amount per ton of 50 cubic feet
Cooch Behar.			Rs. A. P.	Rs. A. P.	Rs. A. P.
Sál logs	513*	28′ 0″ 0‴	9,774 6 1	19 0 10	37 8 0
Sál sleepers	843†	3′ 4″ 0‴	1,689 8 0	2 0 0	16 0 0
Karla khumbas	209	.....	730 2 0	3 7 10	.....
Shingles	625	.....	1 14 0	.....	.....
Assam.					
Nabor logs	54	19′ 0″ 0‴	816 0 0	14 5 3	37 8 0
Ajar logs	35	19′ 0″ 0‴	501 3 3	14 5 3	37 8 0
Total	2,279		13,513 1 4		
Deduct amount due but not realized during the year			1,346 2 0		
Balance			12,166 15 4		
Add amount realized on account of former years			714 10 0		
Total shown as revenue on account of timber sales			12,881 9 4		

* Inferior timber. † Rejected sleepers.

Form No. 27.

FOREST DEPARTMENT, BENGAL.

Statement showing the Description of Work done, Quantity of Timber removed, and Amount paid during 1871-72.

Logs.			Sleepers.			Planks and Scantlings.			Total.
Description of work.	Number.	Amount.	Description of work.	Number.	Amount.	Description of work.	Number.	Amount.	
Cooch Behar Division.		Rs. A. P.			Rs. A. P.			Rs. A. P.	Rs. A. P.
Removing from forests to roads or banks of rivers ...	936	1,093 10 0	Removing ...	12,259	594 0 0	Sawing ...	421	131 15 0	
Carting	405	3,617 0 0	Carting ...	4,182	1,162 13 0	Carriage ...	.....	6 12 0	
Floating	31	76 8 0	Floating ...	261	66 4 0				
Assam Division.									
Floating	413	4,493 14 0							
Total	1,785	9,281 0 0		16,702	1,823 1 0		421	138 11 0	11,242 12 0

Form No. 28.

FOREST DEPARTMENT, BENGAL.

Annual Account of Forest Revenue for the year 1871-72.

	Rs.	A.	P.
Receipts	1,39,089	7	4
Expenditure	1,08,339	12	3
Surplus ...	30,749	11	1
Add difference between assets and liabilities	679	14	5
Total surplus ...	31,429	9	6

Detail of Difference between Assets and Liabilities at commencement and close of the year.

	At commencement of the year.	At the close of the year.	Difference, In favor of the year.	Difference, Against the year.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Value of timber	2,72,657 4 7	2,65,431 1 0	.....	7,226 3 7
Ditto elephants and buffaloes	9,148 12 0	14,318 12 0	5,200 0 0	.
Outstanding on account of sales	714 10 0	1,846 2 0	631 8 0	... .
Excess payments to contractors	16,400 13 5	18,475 7 5	2,074 10 0	... ..
Total assets ...	2,98,921 8 0	2,99,001 6 5	7,906 2 0	7,226 3 7
Deduct difference ...	.....	.....	7,226 3 7	..
Balance ...	.....	.....	679 14 5	... ..

FOREST DEPARTMENT, BENGAL.

Statement of Value of Timber in hand on 31*st March* 1872.

Description of Timber.	Quantity. Number of logs and pieces.	Quantity. Cubical contents.	Estimated selling rate per cubic foot.	Estimated value.
In Station Depôts.			Rs. A. P.	Rs. A. P.
Logs	2,835	98,089	1 8 0	1,47,183 8 0
Sleepers	14,060	48,523	2 6 0 each	33,392 8 0
Planks and scantlings	891	.....	0 12 0 „	798 12 0
Karla khumbas	337	.....	0 4 0 „	84 4 0
Forest Depôts.				
Logs	5,515	1,58,085	0 8 0	79,042 8 0
Sleepers	11,119	37,302	0 7 0 each	4,864 9 0
Planks and scantlings	394	.....	0 2 0 „	49 4 0
Karla khumbas	126	.....	0 2 0 „	15 12 0
Total ...	35,277	3,41,999	.....	2,65,431 1